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CONSERVATION OF NATIONAL RESOURCES

CONSERVATION OF NATIONAL RESOURCES

AN EDUCATIONAL APPROACH TO THE PROBLEM

George T. Renner

PROFESSOR OF GEOGRAPHY, TEACHERS COLLEGE, COLUMBIA UNIVERSITY
CONSULTANT, U. S. NATIONAL RESOURCES PLANNING BOARD

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*Be ashamed to die until you have won some victory for
humanity.*—HORACE MANN.

FOREWORD

In 1910 President Van Hise of the University of Wisconsin declared that conservation was more important than any other problem confronting the American people. During the three decades since, it has not lost importance. On the contrary, among the pressing, often critical, issues that have arisen, the conservation of resources persists as fundamental to the ultimate welfare of human beings.

This problem may be solved in two ways: legislation and government control imposed from above, or education and voluntary co-operation developed from within. It is probably impossible to use either one without the other. In a despotism the pattern would be to issue many orders and exercise much control with little education. In a democracy it would be hoped that a vigorous program of widespread self-control would in turn require little government control. In any event, the educational agencies of a democracy cannot avoid the issue of conservation of national resources. Rather it should be a primary concern.

American schools have made a large contribution to the teaching of conservation. Since 1910 there has appeared an increasing amount of literature on the subject. The number of textbooks has become considerable. Without exception these latter have concerned themselves primarily with technical subject matter of conservation rather than its educational philosophy and teaching problems. This textbook, in contrast with others in the field, gives little attention to the technical aspects of conservation. Rather, in striking fashion it reviews the waste of resources in America and makes a powerful argument for an educational attack upon the various social factors which cause this waste. It tells the story of the growth of the conservation movement, classifies natural resources from the point of view of conservation, lists and evaluates the educational material available, and examines the philosophical and curricular problems involved. In making an outline of the problems and possible remedies in connection with each major classification of resources, it presents an organization useful to the teacher.

At the end of each chapter several controversial questions are asked. In answering these the student will need to reorganize his thinking and bolster his conclusions with a wide range of facts. By

this process he should secure a firmer grasp upon the subject matter and develop judgments and conclusions of his own. The basic idea of this book is that a nation is great, not because it mines coal, cuts timber, or builds railways, but rather because it has learned how to produce, build, and grow without destroying the bases of its future existence. Despotism can accomplish this by orders. Democracy must do it more by education. It is hoped that this text will help our teachers and pupils to learn how to come to terms with nature. Without this no democracy can have permanent existence no matter how much we may love it or how enthusiastically we may support it.

WILLIAM F. RUSSELL
Dean of Teachers College
Columbia University

PREFACE

The conservation movement in America has lately come of age. It need no longer remain on the defensive—seeking to justify its premises and conclusions. It is not premature, therefore, for the conservationist to undertake the outlining of a positive program of educational action to replace previous efforts designed merely to demonstrate and convince.

At the very outset, such a program calls for the thorough conditioning of our teachers in the historical backgrounds, the present social and economic settings, and the future intellectual and civic implications of the great problem of men and resources. For use in achieving this, our present type of conservation textbook is only partially adequate. Accordingly, in preparing this book, I have attempted to design a conservation education textbook upon a new pattern.

Part I, *Facts, Ideas, and Objectives*, reviews as graphically as possible the evidences of resource destruction over the United States, analyzes the fundamental process of resource use, and examines the nature, scope, and development of the conservation idea. It seeks to point out the specific ideas and motives which must be inculcated in our youth if conservation is ever to become a part of our national mores.

Part II, *Outline of Resources, Problems, and Proposals*, presents in synoptic fashion a résumé of the major problems in our use of each of the principal classes of resources, together with proposed remedial treatments, in so far as they are now known. Joint democratic planning for resource use, by the citizen and his governments, is analyzed and evaluated.

Part III, *Curriculum, Methods, and Materials*, seeks to sort and evaluate the materials and information available to the teacher and pupil. It shows how subject matter may be organized for professional educational use. It points out the curricular and administrative implications of conservation education for the school of tomorrow.

I have planned this book to meet, in varying degree, the needs of some four types of readers. For the student in teachers' colleges, normal schools, and university schools of education, it should serve as a basic textbook. For him, however, frequent reference to some

standard subject-matter treatment of conservation would seem to be desirable. For the student in the college and university liberal arts class, it should prove to be valuable supplementary reference providing a statement of the theory and philosophy of conservation—its objectives, social setting, and educational significance. For the teacher-in-service, it should serve as a useful guide and teaching manual. The outlines in Part II, particularly, should provide a syllabus for his use in preparing and teaching the actual class units of subject matter. Finally, for the ordinary citizen reader, it will provide a succinct and easily grasped total picture of the conservation program—its meaning, its consequences, and its relation to the American way of life.

NEW YORK
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GEORGE T. RENNER

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PART I

FACTS, IDEAS, AND OBJECTIVES

CHAPTER I

EVIDENCES OF RESOURCE WASTE

Any nation must sooner or later be judged before the tribunal of world history. It will be judged in terms of its policies and actions toward its natural resources. In the words of Theodore Roosevelt, "The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value"¹ That the American nation has not done, and is not doing this, is revealed when we note that European dictators have thought the most telling criticism which they could level at the democratic nations is—"they blunder and they waste."² Quite apart from the fact that this is a partisan criticism and that dictatorships themselves create their own peculiar and terrible forms of waste, it is true that as a nation the United States has wasted and damaged its resources appallingly.

Such waste of resources is not simply a question of good or bad national morals; it involves the whole question of man's respect for his own civilization. Civilization has two aspects—spiritual and material. The first is in man's head, and is moral and intellectual in nature. The second is outside man, and consists largely of machines and other mechanical contrivances. Primitive man had all of the urges to build, to paint, to design, to seek truth, and to dream of great things, which move man today. But he was compelled to spend so much of his time killing his food with stone axes and rude spears, or growing it with the aid of crude digging-sticks, that he never got much beyond the dream stage. Machines have given modern man both the time and the power to develop morally and intellectually. Thus, spiritual civilization is made possible and supported by material civilization. Man's achievements in science, art, philosophy, and education are rendered possible by his fertilizers, tractors, machine tools, factories, mines, bridges, boilers, and buildings. Without these things we have only man the primeval savage, toiling in sun and frost and wondering vaguely about

¹ Theodore Roosevelt Memorial in the American Museum of Natural History.

² J. P. Gavit, "What Do You Mean—Conservation," *Survey Graphic*, Vol. XXV, No. 10, October, 1936, p. 576.

God and truth, about the world in which he lives, about his own nature, and about what lies beyond the stars.

Material civilization, however, has not been created out of effort alone. It has been constructed by people out of natural resources—lands, minerals, waters, and such like. Moreover, it is today maintained only by the ceaseless exploitation and reshaping of these resources. Thus, our world presents the picture of a moral and intellectual status of man dependent upon the machine, and the machine feeding upon natural resources. The whole system must necessarily collapse if its foundation of resources is depleted or allowed to fall into disrepair.

DISTURBING SIGNS

In the very center of our country lies a region called the Great Plains. It was originally the finest grassland on earth, capable of supporting millions of cattle each year for untold centuries. We began to plow it up and, despite disturbing signs of wind erosion, we kept at it. In the early 1930's a cycle of dry years began. Early in 1934 the soils of this once fine grassland were so thoroughly dried out that the whole region became a "desert on the march" and cast its dusty shadow 2,000 miles eastward to the Atlantic Ocean. The fertile soils of the Great Plains were even showered down on the decks of ships far out to sea. The dramatic story of loss and human suffering on the plains will live long in the memories of Americans.

Wet years have come again and the soils of the Great Plains are once more anchored by the roots of crops, but dry cycles are as bound to recur as are wet ones. With them will come renewed destruction unless a large part of the area is returned to grass—its natural covering. Repeated losses, such as the loss which occurred between 1933 and 1938 on the Great Plains, will leave only the coarse sand behind, sand to form an American "Gobi" Desert.

The "dust bowl" drama of the Great Plains was so colorful that it compelled the attention of the entire nation, but other far more serious losses go almost unnoticed because they are not dramatic. The fact that the waters of the Mississippi and Missouri rivers are exceedingly muddy usually is given little attention, but it is really more alarming than all the dust storms, the unemployment, the communists, and the foreign aggressors put together. It is the mute evidence that the fertile soils of the American Middle West, the world's greatest breadbasket, are being washed off layer by layer and carried silently down-

stream to form mud flats on the floor of the Gulf of Mexico. It is a process which works night and day, month after month, year following year, as we abuse and assault this part of America. (See Fig 1.)

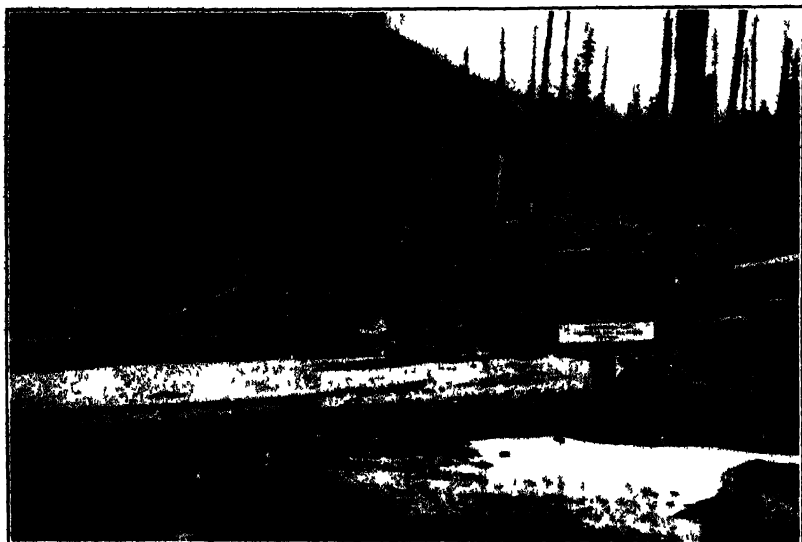
It is not alone the land which suffers. Magnificent forests have dwindled to burned-over wastes of blackened stumps incapable of restocking themselves in new crops of trees (See Fig 2) Wildlife dis-



Photograph by G. T. Renner

FIG. 1 A gully which is destroying native pasture in western Iowa. The gully is less than forty years old but is already some fifty feet wide and twenty-five feet deep

appears and insect plagues increase. Streams alternately burst into uncontrollable floods or dwindle to menacing trickles of liquid filth. (See Fig. 3) Mines have been worked out hurriedly and wastefully; coal seams have been left to burn smolderingly through decades. Huge jets of natural gas, that most perfect fuel known to man, are allowed to burn like great torches because it is too much trouble to quench them, or they are let escape to the sky in a "stripping" process which yields a few gallons of gasoline to the miser's hand. Over wide locali-



Photograph by U S Forest Service

FIG. 2 Burned-over forest land in Washington



Photograph by G. T. Renner.

FIG. 3. Roadside pollution of a once beautiful brook in a town which advertises itself as a high-class residence area

ties, the natural resources have been destroyed or depleted, leaving entire communities stranded without any further economic base.

FURTHER EVIDENCES

On all sides are visible evidences of waste, unjustifiable destruction, needless exploitation, and senseless misuse of resources in thousands of different forms: droughts, floods, dust storms, soil erosion, land exhaustion, vanished fish and game species, polluted beaches and waters, and distressed tenant farming (at its worst, approaching "Tobacco Road" conditions; at its best, none too good). Further evidences are decayed rural communities, urban slums and blighted areas, abandoned railways, submarginal and abandoned farms, stranded industrial communities, boarded-up rural schools, overproduction of certain crops, minerals, and manufactured goods, industrial waste, scarcity of certain key raw materials, unemployment, child labor and industrial peonage, increasing highway and street congestion, mounting traffic accidents, billboards and other unsightly objects disfiguring the landscape beauty (see Fig. 4), commercialization of scenic areas, and unwise land subdivision.

OBSERVE THE DATA

It is distressing to travel through much of the United States today. North America was originally the most abundantly endowed and the most beautiful of all the continents. Moreover, with the exception of Australia, it has been occupied by civilized man for the shortest length of time. And yet, despite these two favoring circumstances, the continent is already in a bad state of repair.

Through wide and formerly prosperous agricultural districts, the fields lie with topsoil washed thin and slopes gashed by rapidly lengthening and deepening gullies. The inevitable poverty accompanying such soil wastage is reflected in unpainted houses, dilapidated barns, and discouraged-looking cropland. In the forest regions are mile after mile of blackened stumps and fallen logs (Fig. 2). In the western grazing country the range lies thin and overgrazed, its sod weed-choked and seamed by rapidly eroding arroyos. In the Appalachian bituminous coal fields, dirty, down-at-the-heel mining towns huddle in dismal disarray in grimy valleys—their houses sagging and their children drooping. In the lead and coal-mining districts of the Midlands, the landscape is scarred by ugly chat heaps and bald dumps of mine tailings. Our industrial towns are smeared with soot under a pall of

smoke. Our smelting centers stand each in the midst of its own man-made desert, its once green environs rendered bare and lifeless by poisonous smelter fumes.

Our great cities are great only in business activity, for they are unutterably poor in human-living values. They stand as monuments to man's selfish trafficking in real estate, to his artificially created monopoly-scarcity of land—in a nation which has more land than it



Photograph by G T Renner.

FIG. 4. Important resources of scenic beauty are defaced by roadside signboards.

needs. The heart of each city is a cancerous focus of traffic congestion, its periphery a slumlike zone of near-urban aspirations, which simultaneously repels nature and fails to attract the city. These great cities are constantly growing larger, and in doing so they create run-down rural communities and half-deserted villages over their wide hinterlands. They are constantly gathering into themselves the cream of rural America's people. Once in the city, these new arrivals must live under conditions which soon reduce their rate of reproduction to the vanishing point, and increase their social insecurity to the point of creating mass fear. These same great cities are constantly spawning hosts of unsightly suburbs, and sprinkling their urban spores as "roadside slums" along every major highway. There is as yet no limit

in sight to this spreading blight of uncontrolled urbanism, nor to the wreckage and abandonment of the rural areas. Although the United States is still a young and growing nation, evidences of decay have already begun to appear in both the urban and the rural landscape.

We have built magnificent highways from one end of the country to the other. Supplementing these are hundreds of thousands of miles of secondary roads. Both highways and byways have usually been constructed without regard for either beauty or the latent forces of erosion. Hills have been cleft with great gashes by the road maker, and steep fills of loose earth have been built across valleys and low places. Boulders, stumps, overturned trees, and heaps of debris have been strewn along the right-of-way. These naked fills and cuts and the raw ditches along the roadside have been the starting point for millions of young gulleys. From New Jersey to Oregon these are hungrily eating their way back from the roadside into fine farmland. Into them sag defeated fences, in them lie bedsprings, ancient automobiles, tin cans, and a thousand other discarded artifacts of civilized man. On all hands flow poisonously polluted streams and choked streams, streams ready to burst into flood in time of heavy rain, goaded to retaliation by human mistreatment. Our beaches in the neighborhood of the larger cities are rendered all but inaccessible by solid lines of shacks, houses, hotels, and other even more miscellaneous structures, monuments to our anti-social premise that "First Comers are Owners." The high-tide mark of many of these same beaches is traced out by a line of deposited filth from metropolitan sewers. The waterfronts of our cities themselves are, in contrast to those of Europe, lined with unsightly factories, warehouses, and shacks—a practice which renders our cities hideous and which prevents the public from deriving any benefit from the waterfront.

The great runs of shad, salmon, and other fish which one ascended our rivers have all but ceased. The last passenger pigeon died in 1914. The bison and the beaver are all but extinct. The prairie chicken, the turkey, and the American parrakeet have forsaken most of their former haunts. The waters of some of the streams in our industrial districts are so heated from factory use that a fish would be boiled alive had he the temerity to venture into them.

For every ton of coal we have mined, another ton has been irretrievably left in the ground. For every barrel of oil we have refined, two barrels have been lost. For every tree cut down more than half of it has been wasted. Most of our big game has been killed, much of our natural beauty defaced.

Roderick Peattie, in his book, *Geography in Human Destiny*, states it thus:

. . . in these three hundred years we have spread our human pest over the continent and far advanced the land's despoliation. We have plowed cruel strips, and mined out scars, we have polluted air and stream, and man-made sores fester on the landscape. Learn how tree and grass have died from smelter fumes about Butte, Montana. Read about the hideous erosion of the hills about Ducktown, Tennessee. Observe the ugliness and squalor of the tenement district in any New England cotton town. And if you have compassion enough and not too great love of nature, visit the West Virginia mining communities.³

Americans travel widely and observantly. Unfortunately they do not, for the most part, know how to interpret such disturbing signs. But as these and scores of other symptoms assault our national consciousness, an increasing number of people are becoming concerned. This concern should deepen to alarm when we observe that in our nation, with an original equipment in resources which staggers the very imagination, there are during "normal" times many millions of former workers who have no work to perform. An admission of this kind is serious because we actually support fewer people per square mile in the United States than does any other mature nation; it is disastrous because none of our great cities is producing enough young people to maintain its present population; it is ominous because the three great areas in the nation which *are* producing a surplus American population for the future are the most underprivileged and the poorest in resources.

In 1934, the Mississippi Valley Committee declared:

If certain present-day trends were to be projected unaltered into the future, the map would be a sorry one. We would be compelled to show increasingly large stretches of once fertile lands stripped of their life-giving humus, rivers breaking forth in floods of increasing severity as the denuded slopes permitted an ever swifter runoff, industry and agriculture becoming ever more precarious, the life of the people on the land becoming more and more disorganized, and a steady increase of farm tenancy and economic dependency.⁴

³ R. Peattie, *Geography in Human Destiny*, George W. Stewart, New York, 1940, p. 231. (Quoted by permission of the publisher.)

⁴ Report of the Mississippi Valley Committee, Government Printing Office, 1934, Washington, D. C., p. 230.

GENERALIZING THE DATA

These thousands of forms of resource waste and misuse are more easily understood and grasped when they are reduced to the following simple generalizations:

1. Soil is depleted or destroyed.
2. Forests are cut over and burned.
3. Water resources are wasted or polluted.
4. Grasslands are overgrazed.
5. Wildlife is not protected.
6. Minerals are wasted.
7. The flood menace is being augmented.
8. The wrong areas have often been cleared, drained, or irrigated.
9. Scenic and recreational resources are defaced.
10. Communities are allowed to develop along lines unfit for living.
11. Human and cultural resources are allowed to deteriorate.
12. Economic production is not geared to social needs.

In a totalitarian state, these would probably constitute problems only for the governmental heads, but, in a democracy where responsibility for action resides in the citizenry, they constitute direct prob-



Courtesy of the Plymouth Information Bureau.

FIG. 5. Plymouth Rock, one of the starting points of the American Nation. Even this revered monument has had to be protected from the savage attacks of souvenir hunters.

lems which come home to every one of us. Moreover, the task of seeing that our citizenry is an enlightened one capable of dealing intelligently with its problems (see Fig. 5) and that remedial action is begun before it is too late devolves upon education. Those who teach, administer, supervise, control, or support the schools, therefore, are faced, from a second and different angle, by these same problems which press upon all of us as citizens.

THE TEACHER'S FORUM

1. Are most people indifferent to waste and destruction? Are they insensible to a lack of order and beauty? Why?
2. Are human beings naturally anti-social, or are they co-operative?
3. When capitalists and businessmen exploit resources in a wasteful way, is it because of the innate "cussedness" of human nature? Or is there another answer?
4. Would it solve the evils of our economic system if we had more "morality"? If we had more "religion in education"? Why do so many people advocate these as the cures?
5. To what extent can an individual deviate from the general behavior produced by the institutional set-up in society?

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CHAPTER II

THE PROBLEM OF RESOURCE USE

America was, when discovered, a continent of almost unbelievably rich resources in an almost completely unused condition. To this richly endowed land came great numbers of English, Dutch, Ulstermen, French Huguenots, and other people in whom a faith in individual enterprise and freedom was highly developed.

THE AMERICAN PLAN

The government which they founded consistently pursued the policy of getting its public domain into private hands as quickly as possible. Its feverish haste to accomplish this resulted in public land sales, confirmation of squatter sovereignty, pre-emption laws, homestead laws, grants, and reclamation of land for disposal at cost. It was commonly believed that if the Federal Government could get land ownership distributed around pretty generally, there would result an almost universal participation in the control of economic production, and nearly everyone would have a stake in the new commonwealth.

This public policy was reflected in a long series of laws and public practices:

1. Public land sales, colonial times to 1820.

Sale of lands by public officials and land-development companies to private buyers.

2. Pre-emption Law, 1820.

Confirmation of squatters' sovereignty over the public lands which they had occupied, upon payment of \$1.25 per acre.

3. Homestead Law, 1862.

160 acres of public land practically free to each settler.

4. Timber Culture Act, 1873.

160 acres free, and an additional 160 acres if 10 acres of trees were planted on it.

5. Desert Land Act, 1887.

Size of the free homestead enlarged to 320 acres provided a part of it were irrigated.

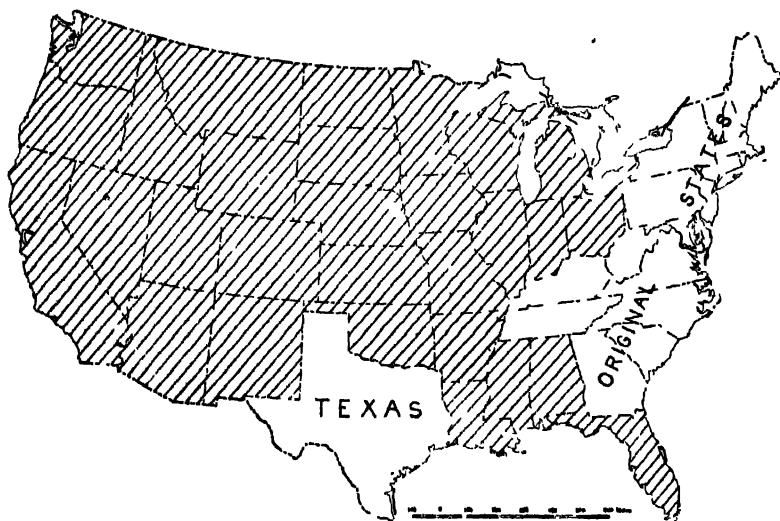
6. Enlarged Homestead Act, 1910.

Size of the free homestead enlarged to 320 acres without any conditions attached.

7. Stock-Raising Act, 1916.

Homesteads of 640 acres (1 square mile) permitted on all lands classified as stock-raising rather than agricultural.

The public domain originally consisted of approximately 1,800,000,000 acres (see Fig. 6), and of this about 41 per cent was disposed of



Map after Du Puy and Wilbur.

FIG. 6. The portion of the United States which at one time or another has formed part of the public domain.

through these various practices (cash sales disposed of 25 per cent, and the various homestead laws disposed of 16 per cent) To speed up the process, the Federal Government for many decades has built irrigation works and made reclaimed land available to settlers at cost. Quite in addition to all this, the government has given away some 20 per cent of the public domain as follows:

Grants to railroad companies	8 per cent
Gifts to the states for education	7 per cent
Wet lands granted to the states	4 per cent
Grants to road, canal, and river improvement companies	1 per cent

This left approximately 39 per cent of the original domain in federal hands, but, of the original total, fully 15 per cent had been set aside as national forests, parks, monuments, and military and Indian reservations. Another 3 per cent or so was tied up on pending claims by various private and public interests.

This meant that by 1930 only about 20 per cent of the public domain remained in an unappropriated condition in federal control. For the most part this was the poorest and least valuable part of the original domain. More than half of it was Alaskan land, while much of that in the United States proper was badly overgrazed and subject to erosion. In 1931, the Federal Government very nearly decided to give all the remaining public domain to the states. Then the pendulum of policy swung the other way and, in 1935, all remaining public lands were withdrawn from the reach of private acquisition, under the Taylor Grazing Act. The public domain will henceforth increase somewhat in size, through gifts for public purposes, cession of tax-delinquent lands, and direct purchase of submarginal farmlands for rehabilitation and devotion to other purposes.

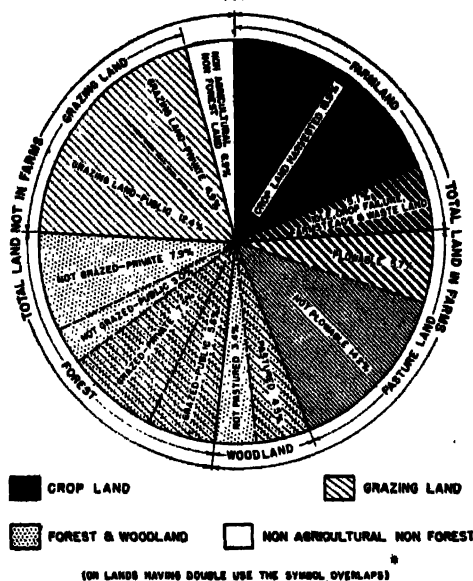
DID THE PLAN WORK?

This national-resource policy never did work very well in *economic* terms. Private ownership and exploitation became, from the very start, more important than the individual care and management of land and other resources. Uncontrolled individualism forged ahead at the task of developing the country without any deference to social values or needs, common-sense economics, or wise programs of resource use and conservation. Forests were in general slaughtered without being replaced, waters polluted, soils handled carelessly, recreational sites pre-empted by selfish private interests, landscape defaced, malformed cities built on strategic sites, and mineral deposits gutted, from the very beginning of our national existence. Despite this, there was, in the early stages, a good deal of wise and far-sighted exploitation of land resources, because the choice between waste and conservation depended upon individual initiative and decision, and not all individual choice was bad. When, however, large-scale industrialization and mechanization occurred in the United States during the latter part of the nineteenth century, the individual no longer had much choice as to whether he would follow wasteful or conservational practices. Wastefulness became an *enforced* part of the industrial system, and waste increased until it became a huge national avalanche.

THE PROBLEM OF RESOURCE USE

MAJOR USES OF LAND IN THE UNITED STATES

1930



Major Land Uses

	Millions of acres	Per cent
LAND IN FARMS:		
Crop land harvested	359	18.9
Idle, failure, and waste	99	5.1
Plowable pasture	109	5.7
Nonplowable pasture	270	14.2
Woodland pasture	85	4.5
Woodland not pastured	65	3.4
Total	987	51.8
LAND NOT IN FARMS:		
Private forest (grazed)	143	7.5
Public forest (grazed)	106	5.6
Private forest (not grazed)	151	7.9
Public forest (not grazed)	57	3.0
Private grazing land	126	6.6
Public grazing land	203	10.7
Cities and towns	12	7-
Parks, reservations, etc.	13	7+
Roads, railroads	23	1.1
Desert, swamps, rocky, and dunes	83	4.4
Total	917	48.2
Total land	1,904	100.0

Prepared in the office of the National Resources Planning Board.

FIG. 7.

Our policy of unlimited individual ownership and unrestricted exploitation of resources worked fairly well in a *political* sense for more than a century, in that it accomplished what it was designed to accomplish, namely, to build a nation rapidly (see Fig. 7); but it is no longer working acceptably or even enduringly. Modern machines have upset it and modern financial organization has threatened to strangle it. Meanwhile, the system continues to run by fits and jerks, sometimes stalling in a "depression" and sometimes running at fever heat when a war, a national-defense program, or a period of market speculation jerks it into action. To be sure, this irresponsible economic plan of ours has given us the means for producing goods on an undreamed-of scale, but it has also given us an exploitation of natural resources at a hitherto undreamed-of rate.

A WASTEFUL PLAN

By using her natural riches, America has erected a resplendent material culture, but this has meant a prolonged orgy of waste—a three-hundred-year Roman holiday, with no thought of the future. Our national resources are still abundant, but their exhaustibility has suddenly become visible to anyone who will look. Moreover, they have begun to wear so thin in places that, unless remedial action be taken, the United States cannot be regarded as a permanent country. Our social order can be prevented from entering a decline only by a thorough and sustained program of conservation.

After a mere 150 years of national existence, some 85 per cent of our useful wild game is gone, and 80 per cent of our timber has been cut. About 67 per cent of our visible petroleum reserves, 65 per cent of our lead and zinc, 51 per cent of our copper, 40 per cent of our better grades of iron ore, and 35 per cent of our anthracite have been used. Well over half of our fisheries are depleted. A large proportion of our best grades of soft coal has been mined, and 10 per cent of our cultivable land ruined beyond repair. Yet these 150 years represent only the lifetime of two men—but what a ruinous pair of lifetimes!

What is making this great waste? Certainly it represents nothing new in human behavior. Man has always been a waster, but his efforts to waste have always been feeble. They were feeble because he possessed only a feeble technology. The technology possessed by man today, however, is not feeble; it is a veritable juggernaut crashing its way through the stored riches of nature, leaving devastation and waste in its path and piling up an economic surplus behind it.

Quite needlessly, we have geared our social and economic system to the unregulated natural capacity of this technology. Consequently, we now must waste our resources or face immediate economic ruin. So far, we have found no other way to behave than to produce as fast as our technology can go, until the surplus becomes overwhelming. Whereupon, we stop all the wheels and suffer a "depression" until the surplus is consumed. Then we repeat the process.

The seats of most ancient empires are today marked by ruin and desolation. Such devastation, history tells us, was wrought slowly, but we in America have, in contrast, wrought swiftly in our destruction. Moreover, the rate of destruction has been cumulative. It has, indeed, become so threatening that only a hermetically sealed optimist could ignore its implications. The principal difficulty lies in the fact that people in general have not been made fully aware of what is happening, they have not been apprised of what it portends, and they have not been shown a way out. Clearly this is a task for the schools.

FURTHER FRUITS OF THE PLAN

Not only has a large proportion of our total national store of resources been depleted or ruined, but many local communities and districts have been well-nigh devastated. Moreover, their populations have been left stranded upon areas of worked-out mines or cut-over forest, or on tracts of poor soil whose auxiliary resources of wild game and timber have been reduced to the vanishing point. Large parts of the United States have been gutted in order to create wealth for distant areas without any benefit accruing to the local populations. For example, parts of a very large region have been exploited and the profits drained away to build each one of our major American cities. Today, each of these cities contains a vast deal of human misery and near-misery, and each is filled with indigestible lumps of transplanted European peoples and their alien institutions. Many of these peoples cannot speak the English language, let alone understand and aid in maintaining the national health and vigor of the nation. Furthermore, they show many signs of "foreignizing" America in line with their own ideas rather than being absorbed by America. Meanwhile, the annual relief bill and the cost of local government threaten to bankrupt the large city. And yet all this was built and paid for, and is now maintained, by the exploitation and partial depletion of resources over large parts of America. Similar situations obtain in all our large cities—New York, Chicago, Boston, Detroit, and so forth. This is not a gen-

erally profitable use of our resources, many of which are irreplaceable. Nevertheless, a limited number of people must have found it temporarily profitable or such a program would not have been followed.

But quite apart from the depletion of whole regions in order to build unplanned cities, some forty million people in the United States today are admittedly underfed, ill housed, and poorly clothed. Indeed, during the past decades, between ten and fifteen million people have not even had jobs. And yet there is in America no dearth of land, labor, and capital—the factors which the classical economists assured us are the things upon which economic production rests. Two-thirds of our people are not yet receiving an adequate education, and yet our nation's resources are the richest on earth. Obviously our present methods of converting natural resources into economic goods are not satisfactory. Somebody must have been satisfied, but the American people in general have not reaped the benefits which they should have reaped, and which under proper handling would have been entirely possible. This offers a tremendous challenge to teachers at all levels in our school system. A new human geography is in the offing; new economic, social, and civic viewpoints must be brought to the American people. The possibility of conserving their national heritage of resources must be taught to every man, woman, and child in the country.

THE TEACHER'S FORUM

1. At one time the Federal Government held title to most of the land and other natural resources of the United States. It gave them away or sold them for almost nothing. Private ownership has ruined or partially depleted most of them. Is it "immoral" or "subversive" of good Americanism to suggest that the government resume title? Why would it not be desirable for most resources? Are there any exceptions?

2. What influence did the presence of free public land have upon men's ideas in the North? What effects did it have upon the soil? What influence did slavery have upon the soil in the South? In between the two were the Pennsylvania Dutch and the Quakers. In general what were their ideas concerning soil? Why?

3. Has the growing mechanization and commercialization of life had any influence upon our treatment of natural resources?

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CHAPTER III

EVOLUTION OF THE CONSERVATION IDEA

Conservation is not a new idea. It has long been held by a few discerning individuals, and occasionally advocated by courageous persons. As early as 1681, William Penn issued an order requiring that one acre in five should be left in timber by those who cleared new land in Pennsylvania. By 1783, twelve of the colonies had enacted game laws of one sort or another. By the beginning of the nineteenth century, George Washington and Thomas Jefferson were practicing soil-conservation methods on their Virginia farms, and advocating them as universal procedures. In 1828, President John Quincy Adams established a live-oak forest preserve near Pensacola, Florida.

The idea of conservation did not, however, take root generally in the American mind. It was rejected by most people, and all conservational ideas came to be identified with niggardliness and a stingy hoarding of those natural materials which provided the means for building a vast nation.

During the first decade of the present century a noticeable change in thinking took place. The term "conservation" was invented, or rather it was given its present meaning, in 1907, presumably by Gifford Pinchot then chief of the U. S. Forest Service. Within a year or two, considerable numbers of men were using the word and propounding the basic idea implied by it.

Just what is this basic idea? What is the meaning of "conservation"? It is not difficult to define, but the exact implication of the definition will depend upon the objectives of the person making it. During the last thirty odd years, several men have attempted to define the idea of conservation, or at least have implied definitions when writing on conservational topics.

CONSERVATION DEFINED

About 1908, President Taft defined conservation as "the greatest good to the greatest number—and that for the longest time." A little later Charles R. Van Hise wrote that "by . . . conservation is meant that [resources] . . . should remain as nearly undiminished as pos-

sible in order that this heritage of natural wealth may pass in full measure to succeeding generations."¹

John Hays Hammond, in 1930, declared that "while conservation in its primary meaning implies saving rather than outlay or deliberate development, the word has come to be closely allied with reclamation, particularly . . . west of the Rocky Mountains."² In that same year, Loomis Havemeyer pointed out that "a wise conservation policy very strongly advocates the elimination of waste, not the curtailment of use."³

In 1932, W. A. Du Puy wrote that "conservation means wise use . . . for the proper purpose at the right time."⁴ According to Erich Zimmermann, "Conservation is any act of reducing the present state of consumption for the avowed purpose of benefiting posterity."⁵ In 1936, Almon E. Parkins stated: "Conservation seeks to insure to society the maximum benefit from the use of our natural resources. It involves the making of inventories, efforts at preservation, the discovery and prompt employment of methods of more efficient use, and the renewal and even restoration of resources."⁶

At about this same time, a group of men representing some twenty-seven administrative units of the University of Wisconsin drew up a comprehensive conservation platform for the nation as follows:

Conservation is the effort to insure to society the maximum present and future benefit from the use of natural resources. It involves the inventory and evaluation of natural resources, calls for the maintenance of the renewable resources at a level commensurate with the needs of society, and requires the substitution, where the conservation of human energy permits, of renewable or inexhaustible resources for those which are non-renewable, and of the more abundant non-renewable resources for the less abundant ones. It not only seeks to eliminate waste of resources if use be economically feasible, but also looks forward to improvements in techniques of production and use, and requires that there be prompt and proper

¹ C. R. Van Hise, *The Conservation of Natural Resources in the United States*, Macmillan, New York, 1910, p. 1.

² C. R. Van Hise and Loomis Havemeyer, *Conservation of Our Natural Resources*, Macmillan, New York, 1930, Foreword, p. xii.

³ *Ibid.*, p. 4.

⁴ R. L. Wilbur and W. A. Du Puy, *Conservation in the Department of the Interior*, Government Printing Office, Washington, D. C., 1932, p. 154.

⁵ E. W. Zimmermann, *World Resources and Industries*, Harper and Brothers, New York, 1933, p. 792. (Quoted by permission of the publisher.)

⁶ A. E. Parkins and J. R. Whitaker, *Our Natural Resources and Their Conservation*, Wiley, New York, 1936, Preface, p. vii.

adjustments to advances in technology. It thus appears that conservation involves the balancing of natural resources against human resources and the rights of the present generation against the rights of future generations. It necessitates, moreover, the harmonizing of the procedures and objectives of conservation with the conditions of the present or future economic order, and calls for a careful allocation of duties and powers among private and public agencies.⁷

Such a program for conservation goes far beyond the original idea of mere protection and implies wise use, that is, use without waste. This new conception of the word includes, even demands, a *planned* use of resources.

COROLLARY STATEMENTS

The explanatory or corollary statements accompanying definitions of conservation are often more enlightening than the definitions themselves. As early as 1908, the National Conservation Association announced that it believed "it to be of the utmost importance that the natural resources of the nation should be comprehensively and vigorously developed and utilized for the promotion of the public welfare, without waste, destruction or needless impairment, and subject always to their intelligent conservation and the effective preservation of the rights and interests of the future generations of our people."⁸

A year later, Van Hise wrote, "The earth is the heritage of humanity. Under our present laws we have largely intrusted that heritage to the care of individuals and corporations. They should so administer this trust . . . that succeeding generations through unending years to come may have their share in these benefactions of nature."⁹ Twenty years after these lines were written, John Hays Hammond called attention to the fact that "to the layman the term conservation is often something of a misnomer implying a mere hoarding of natural wealth. . . . The real purpose of intelligent conservation is simply to guard against 'wilful waste' so that future generations need not be handicapped by 'woeful want.' At the same time, while we are aiming to prevent the depletion of the great resources with which our country has been blessed, it follows logically that these resources must not be permitted to lie in a state of unproductive idleness. . . . The real problem of conservation, then, is plainly a problem of efficient devel-

⁷ This definition was written by C. K. Leith and first published in *Science*, Vol. 82, Aug. 9, 1935, pp. 109-110.

⁸ Quoted in C. R. Van Hise, *op. cit.*, p. 394.

⁹ C. R. Van Hise, *op. cit.*, p. 16.

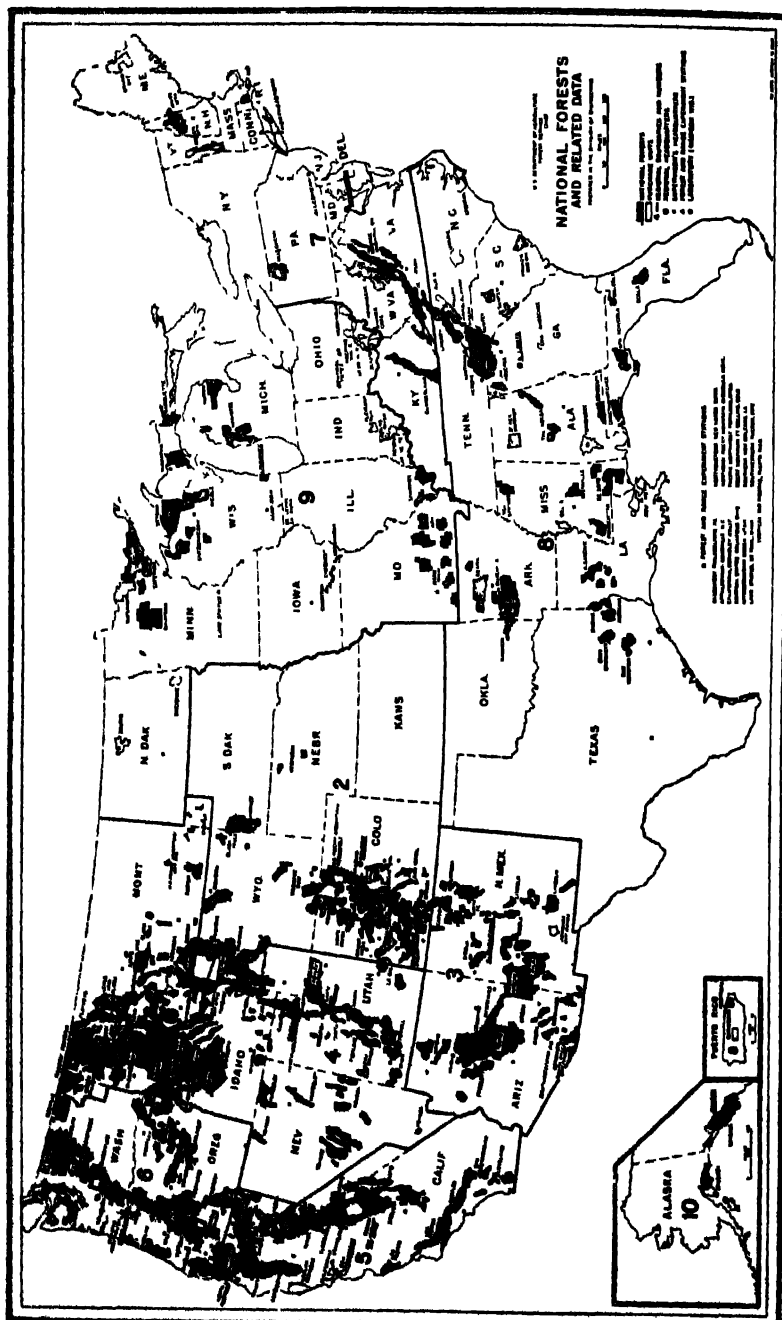


Fig. 8. National forests, state forests, and national forest purchase areas. Courtesy of the U. S. Forest Service.

opment and wise utilization.”¹⁰ In this connection, however, Loomis Havemeyer points out that “a balance must be reached between the needs of the people of today and those of tomorrow.”¹¹

The idea of deliberate resource-use planning appeared, about 1932, in a statement by W. A. Du Puy: “Conservation does not mean the hoarding of natural resources for a hazy indefinite future. It does, though, mean intelligent and thoughtful planning for every resource of our continent. . . . We begin to see, as we look forward, the vague outlines of a future policy which will bring about a more intelligent use of our natural resources and which will restore some of the values we have lost.”¹² Along this last vein, Glenn Frank remarked that “conservation is a sustained effort to make good the mistakes of our pioneer forefathers, who were content to take all they could get out of their immediate environment and then move on to fresh fields of exploitation.”¹³ (See Fig. 8.)

In 1936, the planning motif was definitely injected into the concept of conservation: “A conservation, designed merely to save, can have no more than academic interest to a society which threatens to suffocate in an over-abundance [of economic production]. . . . To conserve human values, to enrich facilities for living, and to devise a plan for the orderly and balanced exploitation of resources—there lies the major challenge.”¹⁴

THE URGENT NECESSITY FOR CONSERVATION

The men who have assumed leadership in defining and expanding the conservation idea have unanimously agreed that it is a problem of the highest importance and urgency. In 1910, Van Hise wrote, “Conservation . . . it seems to me is more important than all other movements now before the people.”¹⁵ Twenty years later Havemeyer was still able to say that “this problem of conservation is . . . vital to the future prosperity and happiness of the nation. . . . In themselves, resources are nothing except . . . [that] their loss will prevent man from reaching his highest development.”¹⁶ Hammond reinforces this

¹⁰ C. R. Van Hise and Loomis Havemeyer, *op. cit.*, Preface, p. vii.

¹¹ *Ibid.*, p. 4.

¹² R. L. Wilbur and W. A. Du Puy, *op. cit.*, p. 154.

¹³ Quoted in C. N. Elliott's *Conservation of American Resources*, T. E. Smith and Company, Atlanta, 1940, p. 26.

¹⁴ A. E. Parkins and J. R. Whitaker, *op. cit.*, p. 593.

¹⁵ C. R. Van Hise, *op. cit.*, p. vi.

¹⁶ C. R. Van Hise and Loomis Havemeyer, *op. cit.*, p. 4.

by declaring that "no problem confronting the Nation today presses harder for readjustment than the conservation of natural resources."¹⁷ About that same time Du Puy informed us that "the day of the amateur in the conservation and preservation of our continent and our child life is past."¹⁸

In 1936, Wallace W. Atwood wrote: "The problems of conservation are vital to each and every citizen of the nation."¹⁹ Parkins and Whitaker wrote in that same year: "It is obvious that conservation as here defined is a field of vast national import, and of such magnitude and range as to depend on the cooperation of nearly everyone. . . . Conservational programs involve both short-time and long-time views, and both governmental and private action.

"The movement is a timely one, because the period of reckless spending, which continued unabated through the first decades of this century, has not as yet been carried to the point of national bankruptcy. There is still time for making community, state, and nation among the best of places in which to live."²⁰

Jesse H. Newlon supports this view in these words: "We impoverish ourselves and the generations to come. Fortunately, it is not too late. . . . Greed and waste are being very slowly checked, but they must be stopped in their tracks."²¹ Stuart Chase has summed up the situation by exclaiming graphically: "The question is whether the American people want to ruin the land God gave them to live on, ultimately to die like the locusts, or to protect that land so that their children and their children's children can go on living there."²²

THE CHALLENGE TO EDUCATION

What challenges the nation must perforce challenge that nation's schools. Van Hise knew this, and at the very inception of the present conservation movement warned, "There is before us a profound and wide campaign of education which must start at the universities, in national and state organizations, and must extend from them through the secondary and primary schools to the whole people. . . . It is a

¹⁷ C. R. Van Hise and Loomis Havemeyer, *op. cit.*, Preface, p. vii.

¹⁸ R. L. Wilbur and W. A. Du Puy, *op. cit.*, p. 167.

¹⁹ A. E. Parkins and J. R. Whitaker, *op. cit.*, p. 20.

²⁰ *Ibid.*, Preface, p. vii.

²¹ G. T. Renner and W. H. Hartley, *Conservation and Citizenship*, Heath, New York, 1940, Preface.

²² K. Glover, *America Begins Again*, McGraw-Hill, New York, 1939, Foreword, p. x.

campaign of education which will extend through generations." ²³ Two decades after this, Gar A. Rousch stated that "twenty years ago the standard remedy of the conservationist against all sorts of evils was legislation, but in the meantime the attitude has undergone a radical change and it is now seen that the chief need is for education." ²⁴

A decade later, despite the considerable amount of desirable legislation under the "New Deal" in American politics, it could still be reiterated that education was (and is today) the factor most needed in promoting conservation. By this time, it should be clearly evident that conservation is not a mere fad or transitory movement, nor even the policy of any particular party. It is a national necessity and may not be overlooked nor treated lightly by our schools. It is to be assumed, therefore, that the present indifference of our schools must soon cease, and that they will assume before long the role of creating a public opinion actively favorable for the consummation of conservation programs.

In 1940, C. N. Elliott warned that "America is a land richly endowed, but our heritage in natural resources cannot be restored and preserved unless we develop and support an adequate program of conservation." ²⁵ A few months earlier, Newlon had declared: "Our schools have no greater responsibility than that of giving youth some understanding of these resources, of the way in which they have been and are being wasted, and of the problems connected with their conservation . . . and, above all, a vision of the good life which these resources make possible." ²⁶

A report of the Educational Policies Commission, in 1940, makes it plain that "realization of the basic importance of these resources, determination to use them for the common good through long-range planning, and general knowledge of appropriate remedial and preventive conservation procedures are among the marks of an educated citizen. Since future welfare and safety depend upon these things, the schools may well assume considerable responsibility for checking the ravages upon the heritage of the nation made by ignorance, indifference, carelessness, and unbridled selfishness."

It may be stated at this point, however, that a conservation which rests solely upon education and persuasion must fail at almost every point where it comes into conflict with individual interests and property rights. In the end we must build our educational program so

²³ C. R. Van Hise, *op. cit.*, p. 13.

²⁴ C. R. Van Hise and Loomis Havemeyer, *op. cit.*, p. 105.

²⁵ C. N. Elliott, *op. cit.*, p. 13.

²⁶ G. T. Renner and W. H. Hartley, *op. cit.*, Preface.

that it will eventually be expressed in terms of public administration and legality.

"Here is perhaps the biggest challenge which has yet appeared on the horizon. Moreover, it insists upon staying on the horizon and growing larger year by year. Can people, organized democratically, conserve the physical foundation of their social order? No one seems to know, but to deal with such problems we have insisted upon building and maintaining a free and universal system of public education. This freedom for education is not just for fun, but for the serious purpose of creating public intelligence in social and economic affairs. Will we put education to work building a popular will for the conservation of national resources before it is too late?"²⁷

THE TEACHER'S FORUM

1. It is often said that America's great waste of her soils has been caused by ignorance. In the light of the fact that even Washington and Jefferson knew the dangers of soil destruction, advocated soil conservation, and practiced it on their own farms, what seems to be the real explanation?

2. What was the real underlying reason why conservation made such progress during Theodore Roosevelt's Administration? Why were there public scandals in connection with the handling of the public domain in the 1920's?

3. What were the reasons that conservation received a new and expanded emphasis in national life during the 1930's?

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²⁷ G. T. Renner, "Education and Conservation of Resources," *Social Frontier*, Vol. V, No. 44, April, 1939, p. 206.

CHAPTER IV

THE EXPANDING SCOPE OF CONSERVATION

The evolution of the conservation concept in America may be summed up as the growth of a small and rather restricted idea into several very large and socially complex ones. Parallel to this expansion of the conservation concept, there has been an enlargement of the recognized list of things to be conserved. Quite in keeping with this, the range and scope of study materials prepared for conservation education have been much enlarged. This has been clearly evident in the content of the textbooks and supplementary readers dealing with this subject which have appeared from time to time.

A GROWING IDEA

The first textbook in this field was *The Conservation of Natural Resources in the United States*, by Charles R. Van Hise, which appeared in 1910. It dealt with four major classes of resources:

Minerals
Water
Forests
Land

to which was attached a brief section, consisting of less than eight pages, on the conservation of man himself. In 1930, a revised edition of this book appeared as *Conservation of Our Natural Resources*, by Van Hise and Havemeyer. A fifth category of resources—"Wild-life"—had been added, and the appended section on man increased to fourteen pages.

Nearly one-sixth of the book, *Conservation in the Department of the Interior*, by Wilbur and Du Puy (second edition, 1932), was devoted to certain aspects of the conservation of human beings. It also discussed at considerable length our national parks as a resource.

Van Hise's book was in 1936 supplanted by *Our Natural Resources and Their Conservation*, by A. E. Parkins and J. R. Whitaker, as the standard educational treatise on conservation. This book treated fully the five accepted standard resource categories:

Soils
Waters
Forests
Minerals
Wildlife

and added full treatments of four more major groups:

Range Grassland
Fisheries
Recreational Resources
Human Resources

In addition to treating these nine great groups of resources, it introduced some four highly significant topics:

Tree Crops for American Agriculture
Waste and Saving in Manufacturing
City, County, and State Planning
Regional and National Planning

INCREASING ATTENTION TO HUMAN RESOURCES

Any examination of the books which have appeared since 1910 shows clearly how greatly the scope of conservation education has widened and deepened. The treatment accorded human resources is particularly revealing. Van Hise (1910) devotes a mere eight pages to them; Havemeyer (1930), fourteen pages, Wilbur and Du Puy (1932), forty pages. Parkins and Whitaker (1936) allot this subject a treatment co-ordinate with soil, water, or forest. Renner and Hartley in *Conservation and Citizenship* (1940) devote more space to human resources than to any other single main category.

The early leaders in conservation and conservation education were physical and biological scientists. They therefore confined their attention to the physical and biotic resources of the so-called natural world. At the present time, an increasing proportion of our conservationists are social scientists, and these men have insisted that human beings are themselves a form of resource; that man is not only the agent and beneficiary of conservation but one of the main agenda, or objects to be conserved, as well. One may rest assured that a larger and larger share of attention in the total educational program will be devoted to human beings. (See Fig. 9.)

A similar trend may be observed with regard to resource-use planning. In the early literature it is either not mentioned or else re-



Courtesy of the Dallas Morning News.

FIG 9. Land ownership, education, and decent living are beyond the reach of thousands of tenant farmers. It is only recently that we have come to realize that human beings are in need of conservation as much as soil or forest.

ferred to very incidentally. Later, it is injected more concretely and frequently. Most of the more recent books treat it as the dominant motif in the proposed action program.

THE REAL NATURE OF LAND AND LABOR

It is interesting to note that it has taken the American educator nearly thirty years to discover what things are actually included in the term *resources*, and to work out a classification of them suitable for educational purposes. One of the chief reasons for this lag is our habit of looking at resources economically rather than geographically (ecologically).

The classical economist of the nineteenth century taught us that economic production was a process which resulted when the three factors—land, labor, and capital—were brought together under busi-

ness management. The process or activity which follows this was called economic production. If we were to make a simple diagram of what was supposed to take place, it would look somewhat as:

Land + Labor + Capital + management = economic production

If we were to try to express this idea in symbols, it would appear as a simple formula consisting of four constants:

$$(A + B + C) + m = \text{economic production}$$

This was of course an oversimplification of the matter, but oversimplification is often useful in presenting a desired idea. *Land*, as it was used in discussions of economic production, was a blanket term, i.e., it was not one single factor, but was actually a highly complex collection of many factors. In other words:

Land = area + soil material + soil fertility + climate +
vegetation + fauna + mineral resources + many other items . . .

However, it was seldom discussed in that light, and the blanket term actually hid more than it revealed. Moreover, the student never had it impressed upon him that what was referred to as *land* was not a mathematical constant which could be regarded as a definite amount and represented by a fixed symbol such as *A*, but that it was, instead, a collection of highly variable factors which were reducible almost to zero by waste, neglect, or depletion.

To illustrate what is meant by this, one might select at random any one of the factors included under land—such as soil fertility. At any given time, one could call this *S*, but under a system of careless cropping an amount s_1 would be removed from the original amount, *S*, during the following year. After a number of years, the remaining soil fertility, *S'*, would have to be expressed as amounting only to:

$$S' = S - s_1 - s_2 - s_3 \dots - s_n$$

After a long time *S'*, therefore, would dwindle almost to the vanishing point. On the contrary, *S'* might, under proper handling, actually increase year by year. All the other factors included under the economist's term *land* may vary in somewhat similar fashion. Consequently, if one should wish to express land with some symbol, it is much more appropriate to think of it as a variable and call it *X*.

When we finally began to evolve a policy of conservation, our classical economic concept of land was therefore of little use. Consequently, in its place we have come gradually to substitute a geographical concept of land. (A geographer is a person who studies the pieces

of space which make up the earth's surface, in order to find out what use man has made of the resources in each piece. As a result of such studies, the geographer long ago learned that land is really another name for surface space and that its real virtues lie in the things which are present in that space.) Geographically speaking, therefore, land is "space equipped in varying amounts with various other natural resources."

This is not just an idea, it is an actual fact, and a legal fact at that. In American legal theory, ownership of land has almost always implied ownership not only of the soil but also of all natural resources on, above, below, or associated with the soil. Viewed in this light, a piece of land is seen to consist usually of the following twelve great classes of resources:

- Soil
- Climate
- Landforms
- Water features
- Minerals and rocks
- Underground waters
- Coastlines and harbors
- Wild animal life
- Natural vegetation
- Space or area
- Locational values and advantages
- Scenery and recreational values

The things in this list are obviously the very essence of human existence—the natural materials and values—the geographical goods which we transform into economic goods through the means of our technology, a process which we have misnamed "production." Since no life is possible without these natural geographical goods, they belong at least theoretically to all of us. Actually they are, and always have been, the property of a relatively small fraction of the total population. These owners of land and other resources today, therefore, hold the position of trustees for the great masses of humanity, and upon their shoulders rests the responsibility for both the immediate and long-run well-being of society. How have they exercised this trusteeship? In what manner have they treated our common store of resources? Their record is plainly a chronicle of appalling waste, depletion, and ruin.

What has just been said about the inadequacies of our generally accepted notions about the land factor applies equally to our ideas

about the second factor, labor. This term is ordinarily applied to the total number of human beings available for employment and work. This only obscures the fact that the term *labor* includes a great number of different factors such as health, strength, inventiveness, skill, education, and mental capacity. It is obvious that not a ton of coal, a bushel of wheat, a class period of teaching, an hour of governmental administration, nor a page of literature can be produced without labor. But this does not imply that 200 people necessarily produce twice as many useful goods and services as do 100 people. For example, the hereditary mental quality of workers may be much more important than their number. A brilliant chemist who can invent a new fuel, a highly intelligent machinist who can invent a new plow, reaper, or tractor, and a skillful and apt farmer who can operate these machines under varying conditions may be able to produce more wheat than 200 dull peasants with ox-like strength. Hence, one person of superior intelligence or native capacity may, as an economic factor, be worth more than scores or even thousands of persons born of dull or moronic parents. A nation, one-third of whose population ranges from bright to very superior in mental capacity, may not only feed itself but also produce a huge surplus. Such a labor supply is not a constant economic factor, however, even when the birth rate is high enough to replace human numbers each generation. If that nation follows economic, religious, social, or other institutional policies which cause the very superior families to average one child apiece, the bright families to average two, and the dull families to average four to five, the quality of its human resources will eventually dwindle to the point where no amount of charity, educational effort, or social-security legislation can enable it even to feed itself adequately. This variability of human resources also holds true with respect to practices in health, public education, maintenance of social environment, immigration, and so forth. Obviously it is incorrect to regard labor as anything resembling a constant factor. Modern studies in human biology have already given us many facts showing that human resources are a variable which can be modified and even depleted in quality. (Most educators and nearly all the lay public still turn their backs on this fact even though it may possibly be the single most important fact yet known about human things.)

THE REAL NATURE OF ECONOMIC PRODUCTION

The more one studies the nature of land, or as it more appropriately may be called—natural resources—and the uses to which man puts

these resources, the more obvious it becomes that what we call economic production actually produces nothing in any basic sense of the word. It is not really production at all; it is merely a process of conversion or change—the conversion of geographic goods (natural resources) into economic goods (commodities and services). Thus, four miners working in a mine under a manager are said to *produce* a certain number of tons of coal per day. Actually all that has been done is to change coal in a bed or seam into broken blocks of coal in a railway car. A farmer is said to produce a thousand bushels of wheat during a summer. What has been done, however, is to change a certain numbers of pounds of carbon, calcium, phosphorus, potassium, and other elements in the soil into an equivalent number of pounds of cereal. When the coal seam or the soil fertility is exhausted, production stops because there is nothing left to change or convert.

This may appear to be too simple even to discuss, but it would seem to be necessary because of the failure of the ordinary person to realize what is involved. Nearly every day one hears citizens, civic leaders, and even government officials discussing questions of unemployment, national defense, foreign trade markets, and so forth, as though all such problems were matters simply of getting goods produced. Responsible political leaders and sometimes even social scientists are heard to discuss a national shortage of some metal simply in terms of reopening old mines or of opening a certain number of new mines, in total disregard of what kind or how much ore is left to convert into the materials needed. Similarly, the re-employment of idle labor is usually discussed glibly in terms of stimulating the reopening of certain industries, totally without regard to the fact that these industries formerly existed to convert into desired goods specific materials which have now been used up or depleted below the margin of profit.

A third factor in this conversion process (or so-called economic production) is our technology. This is our *equipment* or *means* for effecting desired change or conversion of natural materials into economic goods. It includes science, art, trade practices, accumulated craft skills, organization, machinery, and so forth. It may be feeble and ineffectual, or highly efficient. The slightest invention or improvement, or the increase or decline of a skill, may change the entire picture, and increase or diminish the effectiveness of the productive process. The commonly accepted simple equation of:

$$(A + B + C) + m = \text{economic production}$$

representing four constants, *land, labor, capital, and management* is, therefore, an inadequate if not actually a misleading concept. We can come closer to understanding the matter if we restate it as an equation of *natural resources, human resources, and technology*. In this new equation, natural resources are not to be regarded as a constant factor at all. They can be exhausted and are therefore a variable. Similarly we have many valid reasons for believing that human resources are also a variable quantity. Technology likewise is a variable which is rapidly increasing and changing its nature. Tools, machine tools, machines, machine-tending machines, and belt-line assemblies collectively constitute a variable whose nature we do not as yet even begin to understand. It has already got nearly out of hand, and threatens dire things for the future. It has yielded the positive blessings of better and cheaper goods and shorter hours of labor for those who are employed, but, so far, its chief fruits have been the following four negative blessings:

- (a) increasing waste of natural resources.
- (b) increasing unemployment.
- (c) increasing crowding into city areas
- (d) increasing human insecurity and a consequent fall in the birth rate (particularly among our more gifted people).

Looking at economic production in this revealing manner, we see plainly that we are dealing with a very complex equation of three variables, which, after being simplified and reduced down to the most generalized form possible, might be expressed as:

$$(X + Y)Z = \text{economic production}$$

In this expression, *X* represents the complex variable factor natural resources. To this is added the variable factor human resources, *Y*. The sum of these two factors is then multiplied in effectiveness by the variable factor of technology represented by *Z*. The resulting product of three variables is a quantity the upper and lower limits of which are well nigh impossible to predict. Some may insist upon regarding human resources as a constant, but, even if this be accepted, we would still have to deal with an equation of one constant and two variables (one of which threatens to become depleted and the other to get completely out of control).

Neither of the two expressions which have just been presented is to be thought of as equations in any real mathematical sense. They are equations only in a symbolic sense, and their expression in a pseudo-algebraic form is employed only as a short-hand device for

showing that what we have called economic production is far from being a simple process of bringing together four simple constant economic factors.

THE EDUCATIONAL IMPLICATIONS

If economic production is really this sort of process then it becomes obvious that it is not a self-sustaining nor even a necessarily permanent process. It can be permanent only so long as our stores of natural resources are maintained or are replenished, only so long as our human resources are kept within reasonable limits and maintained in a good state of repair, and only so long as we understand, plan for, and regulate our technology wisely.

This calls for a thorough-going educational program, one which will cover fully the material factors which enter into what we have been wont to call economic production.

The scope of any complete course in conservation education must therefore be wide enough to comprise the following eleven minimal elements:

I. The Natural Resources.

A. Physical.

1. Soils.
2. Waters.
3. Minerals.

B. Biotic.

4. Forest.
5. Range grassland.
6. Fisheries.
7. Wildlife.
 - a. Animal.
 - b. Plant.

C. Physical, biotic, and esthetic.

8. Recreational and scenic resources.

II. The Human Resources.

9. Man power—number, health, welfare.
10. Leadership—ability, talent, genius.

III. Conservation Planning.

11. An understanding of our technology, social forces, and social needs, and the process of planning for resource use within the framework of our democracy.

Even when we shall have succeeded in generally disseminating a knowledge and appreciation of the conservation problem as it is outlined herewith, it is well to keep in mind that the educational program is only one in a total series of six major steps. The six steps whereby a democratic society achieves a conservation program are:

1. The collection of complete or nearly complete data.
2. The formulation of aims and purposes.
3. The planning of policies and remedies.
4. The universal educational program.
5. Obtaining legislation.
6. Final social action.

THE TEACHER'S FORUM

1. Many of the classical economists advocated a doctrine of "laissez faire," asserting that the best interests of an individual always led him to do the thing which would turn out to be for the best interests of society. Bastiat, in fact, professed to see the "hand of God" behind the entire process. Do we generally still believe this? Do some people still believe it? Why?

2. The economist Adam Smith taught that if government would in general keep its hands off private business, the maximum social welfare would be achieved by each person following his own interests. Do any modern businessmen advocate this same policy?

In the field of politics, this same policy is advocated by anarchists. Why do we reject political anarchy, and at the same time often permit economic anarchy? Or is this putting the matter unfairly?

3. Do you think it would be possible to revise our institutions by education and governmental regulation so that we could realize the results Adam Smith wanted, under free competition?

4. The American people have developed a callous disregard of waste and injustice which does not immediately affect them, although they are unbelievably generous under certain circumstances. Is this comparable to the small European democracies which shut their eyes to foreign military aggression, until one by one they found their turn to be overrun had come?

5. Do you think our government is run by men who represent the people, or who represent the interests which elected them? Even in theory to whom does a representative's loyalty belong: to the nation, to his state, to his district, or to those few in his district who marshal the votes for him? What can be done about it?

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CHAPTER V

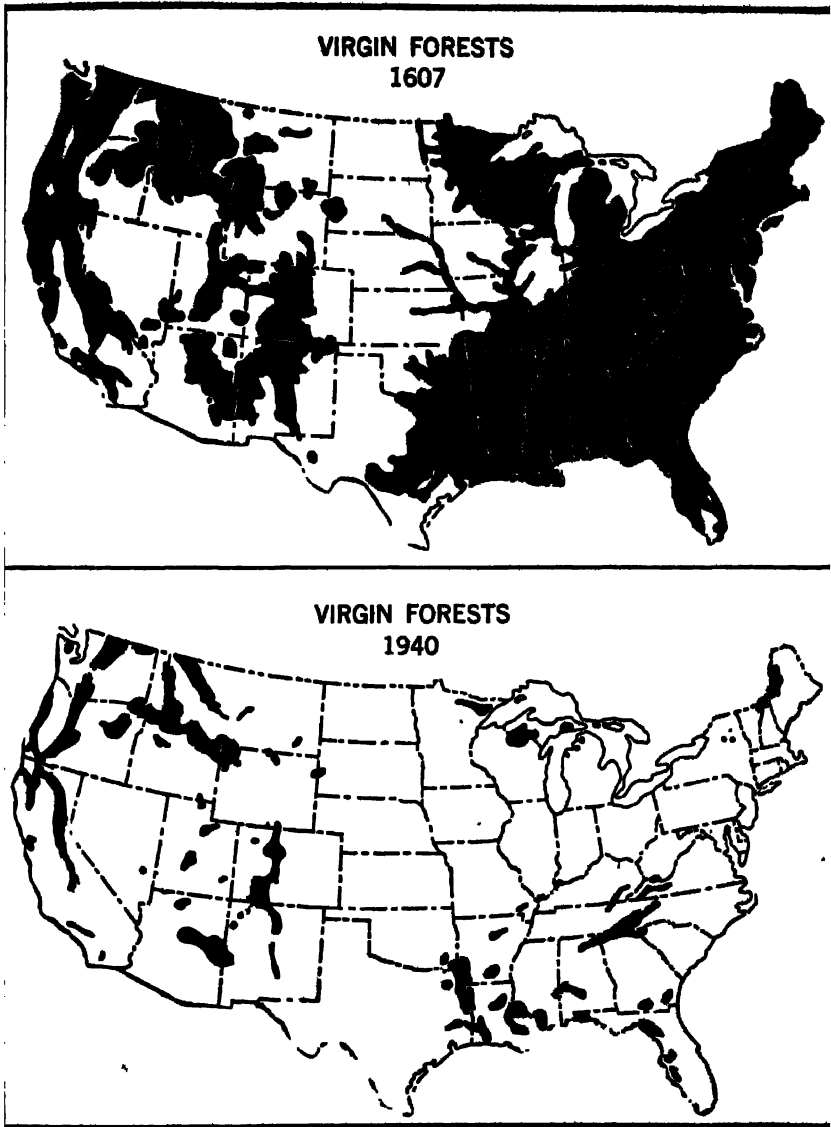
THE RISE OF THE CONSERVATION MOVEMENT

The early colonists in America had a difficult time getting established in their new situation. They encountered strange climates, unknown kinds of soils in some areas, unfamiliar native inhabitants, and wild animals. They also experienced numerous psychological difficulties and problems. These factors called for geographical adjustments to a novel environment, adjustments involving a new diet, new occupations, provision for personal and family safety, and the achievement of psychological independence of Europe—in short, a new way of life.

WINNING A CONTINENT

The 1500's and 1600's were devoted to exploration and colonization; the 1700's to getting established—learning how to utilize the new resources. During the 1800's, the chief aim of the people was the "Winning of the West." As it turned out, what the early American called the West was actually the Near East and the Midlands; the real West, which lay beyond, was subdued only after 1849. All through this period, there was too much space, too much land, too much forest, too much wild game. For generations, the American farmer fought the forest (see Fig. 10); the "backwoodsman" in coonskin cap and leather pants, the woodcutter and "railsplitter" in linsey-woolsey, and the ragged "mountain man" in search of furs were national characters—historico-geographic embodiments of Uncle Sam. The government itself gave away title to natural resources with lavish hand.

In the early 1900's, the United States reached maturity. Free land no longer exists. The remaining public domain is largely submarginal, economically speaking. Much land is already *coming back* to the government, usually in a very bad state of repair. Our other valuable assets such as coal, petroleum, copper, lead, and forests were appropriated long ago. The end of most of them is already in sight. The country must now think in terms of tomorrow rather than today. Fortunately, certain people here and there have been doing this, and,



After U. S. Forest Service

FIG. 10. Three hundred and thirty-three years of forest extermination.

as a consequence, a conservation movement has been developing and gradually making headway.

FIRST STEPS TOWARD CONSERVATION

Perhaps the first episode in that movement was the formulation, in 1869, of a plan to create Yellowstone National Park, a plan effectuated in 1872. The second episode came in 1874, when the American Association for the Advancement of Science sent a communication to the Congress of the United States advocating certain conservational policies (a second communication was sent in 1890). Carl Schurz, an immigrant German who had seen scientific forestry in his native land, became Secretary of the Interior in 1877. He did much to disseminate ideas about forest management and to advocate the establishment of national forests. (See Fig. 8.) The third episode was the appointment of Franklin B. Hough as the first Forest Agent in 1876, which led to the establishment of a Division of Forestry in the Department of Agriculture in 1887.

FURTHER STEPS

From this time on, the Congress has constantly widened its conservational program. In 1888, a Division of Irrigation was created under the U. S. Geological Survey, and the Secretary of Interior was given the right to withdraw from private entry watersheds and reservoir sites. In 1891, the President was given the right to withdraw forest lands and set up national forests, leaving their management to the Department of the Interior. In 1897, the National Academy of Sciences drew up a plan for the development of our national forests and recommended that forestry be given full bureau status in the government. In 1901 this was heeded, and the Division of Forestry in the Department of Agriculture became the Bureau of Forestry, with Gifford Pinchot as its chief. In 1905, it became the Forest Service, and control of all national forests was transferred to it from the Department of the Interior. The enlargement of federal forest reserves went ahead rapidly, withdrawals of forest land being made as follows:

During Harrison's administration	13,416,710 acres
During Cleveland's administration	25,686,320 "
During McKinley's administration	7,050,089 "
During T. Roosevelt's administration	148,346,925 "
Total (by 1909)	194,500,044 "

By 1928, this had been reduced to 160,000,000 acres by the removal of non-forest lands included within withdrawn areas. Meanwhile the states and local governments had acquired nearly 11,000,000 acres of additional forest reserve.

In 1900, the Federal Game Act (the Lacy Act) was passed, and in 1907 the Inland Waterways Commission was appointed. This same year, Gifford Pinchot is credited with having originated the term "conservation" to express the new attitude toward resource use. The next year, 1908, saw the first great publicity move in the drama of conservation—Theodore Roosevelt's "White House Conference" in Washington. This was a convocation of governors of the states and territories, members of the Congress, certain other public officials, educators and scientists, for the purpose of considering the conservation problems of the nation. This was the first time in American history that the governors of the states had assembled. It was also the first time that the conservation issue had been brought out before the public eye.

President Theodore Roosevelt delivered an address, papers dealing with general and special phases of resource waste and use were read, and a series of strong resolutions were adopted. The governors returned to their several states and recommended to their legislatures that state conservation commissions be appointed. In nearly all instances such commissions were eventually established. A National Conservation Commission was appointed and enjoined with the making of an inventory of the natural resources of the nation. This report was published in 1909 as Senate Document 676, 60th Congress, 2nd Session, Government Printing Office, Washington, D. C. That same year, the North American Conservation Conference was convened in Washington in the hope of extending the program into international affairs. Very shortly after this, nearly 85,000,000 acres of federal mineral lands (mostly coal and phosphate) and 1,500,000 acres of water-power sites were withdrawn from private entry.

In 1910, President Van Hise of the University of Wisconsin published his noteworthy book, *The Conservation of Natural Resources in the United States*. For approximately a quarter of a century it was the basis for nearly all educational instruction in conservation. In this light, it must be judged as one of the most profoundly influential books ever published in America.

The Weeks Law, enabling the Federal Government to purchase forest lands wherever necessary to improve the navigability of rivers, was passed in 1911. Two years later, the Migratory Bird Law was passed, and in 1917 the National Park Service was set up. The year

1920 saw the passage of the Federal Water Power Act, and the creation of the Federal Power Commission. The United States Coal Commission's investigation and report to the Senate followed in 1922-1923. In 1924, the Clarke-McNary Act was passed. This highly significant piece of legislation permitted the Federal Government to buy land within the watersheds of navigable rivers (which includes a large part of the entire nation) for other purposes than the unquestioned improvement of stream navigability. This meant, in short, that purchases could include land of value purely for the production of timber (rather than having to be justified as navigation improvement for the "common defense"). This made it possible for the government to secure real national forests in the East, where it had had no previous national domain. It opened the way for the obtaining of national forests by outright purchase where deemed desirable. This supplementary act, therefore, rendered the Weeks Law of 1911 a really adequate instrument for conservation. In 1932, President Hoover appointed a "Committee on Social Trends," composed of leading scientists, social scientists, and statisticians, to investigate and report on critical national problems. Their work culminated in a two-volume report of considerable importance.

ACTION AND REACTION

The early manifestations of conservation during the colonial and early national period bore little fruit. Indeed, their influence was swallowed up in the long cycle of resource development and waste ushered in by "Jacksonian Democracy" and the political rise of trans-Appalachian America. Toward the end of the nineteenth century a new realization of the problem began to emerge once more, but its rate of emergence was slow.

Under Theodore Roosevelt, a tremendous enthusiasm was aroused but most of the results were not very permanent. The program of that day was based upon a great deal of moral crusading. Moreover, sectional interests ran counter to it. For instance, the West and Far West would not support it, because it promised to thwart their economic growth, a growth which appeared certain to reach a high level but which at that time had barely started. The East was, in general, favorable to the program but, even there, the major commercial interests were still expanding their volume of exports. The Middle West was just then approaching maturity and the Great Plains were developing lustily. The South was in general indifferent and was not to realize the full extent of its problems until after the World War.

Most important of all, the American public was almost wholly uneducated as to the nature of the problems involved and the remedies and reforms needed.

A swift reaction set in during the last part of Roosevelt's administration and reached almost overwhelming proportions under Taft. The World War ushered in an orgy of resource waste. This increased to a torrent through the opulent decade of 1919-1929, during which our rapidly developing technology of economic production gradually undermined our financial system. The violent economic crash and financial panic which ensued (which ironically has been called "The Depression") resulted in a period of bewilderment and fumbling from 1929 to 1933.

CONSERVATION GATHERS MOMENTUM

The year 1933 saw the so-called New Deal in American politics under President Franklin Roosevelt. A conservation program of immense scope was made a part of the general social and economic recovery program. This undoubtedly retarded the rate of recovery, but it probably rendered certain aspects of it more sound and lasting. Certainly it introduced several much-needed changes in American habits of acting and thinking.

A considerable enthusiasm and support for conservation arose, this time receiving the attention of many sober politicians and big businessmen. This new epoch in conservation is based less upon moralizing and dire predictions and more upon the careful dispassionate calculations of engineers and social scientists. Moreover, the nation has been less divided than before in its support of most programs, because nearly all sections or regions of the country had suffered strain and temporary collapse and were in a receptive mood. The ruinous economic stoppage and a vast unemployment largely coincided with a succession of severe floods, droughts, dust storms, forest fires, and land abandonments. This brought economic, social, and conservation problems simultaneously into a sharp focus for public attention in a way that had never occurred before. Moreover, as Albert Atwood pointed out in an article in the *Saturday Evening Post*, "When Mr. Roosevelt became President, he carried to Washington a great belief in the principle of conservation; he had been an outdoor man; he had practiced forestry on his own 1,200-acre estate, and, as governor of New York, he had advocated and helped carry out a great land-buying and tree-planting program." Consequently, in 1935, Harold Ickes, Secretary of the Interior, was able to state, with at least partial jus-

tification, that the "New Deal had done more for conservation than all preceding administrations."

In 1933, President Franklin Roosevelt's administration created a considerable number of new emergency units in the Federal Government, among which the following were of especial significance for conservation:

The National Planning Board (under the Public Works Administration).

The Petroleum Administrative Board (under the National Recovery Administration).

The Soil Erosion Service.

The Mississippi Valley Committee.

The Tennessee Valley Authority.

The Land Policy Section (under the Agricultural Adjustment Administration).

The Joint Land Planning Committee (the officers from several federal departments).

The Civilian Conservation Corps (under Emergency Conservation Work).

A number of other agencies which in part were designed to aid conservation.

PLANNING FOR CONSERVATION

In 1934 an event occurred of considerable importance in the history of conservation. This was the creation of the National Resources Board (later, renamed the National Resources Committee, and still later, the National Resources Planning Board). It was created by combining the National Planning Board of the Public Works Administration, the Mississippi Valley Committee, the Land Policy Section, the Joint Land Planning Committee, and several other smaller elements. It was assigned the task of inventorying the nation's resources—physical, biotic, and human; with drawing up preliminary plans for a long-time use of resources; and with fostering regional, state, and local planning processes. Its several studies and reports now constitute the most useful and accessible materials for conservation education.

In 1934, the Taylor Grazing Act was passed providing for the withdrawal from entry of all remaining public domain and its rehabilitation for public grazing range. In that same year, Secretary Ickes urged the Congress to create a Federal Department of Conservation

in the President's cabinet, a proposal which was, at least for the time being, rejected. That year, also, the Federal Government began the active purchase of submarginal farmland for reforestation and the resettlement of the inhabitants on good land. In 1936, the Wildlife Conference was convoked in Washington, D. C., and the Social Security Act and the Wagner Labor Relations Law were enacted. In



Photograph by the U. S. Forest Service.

Fig. 11. Conserving both men and forest. Boys of the CCC replanting well-nigh devastated forest land.

1937, the National Recreation Conference aroused nationwide interest in various aspects of human conservation.

From the foregoing brief record, we may see clearly that conservation is no longer a single or incidental issue, but a rapidly deepening and widening stream of forces running through our whole national life. It demands the active participation by all citizens and the attention of our entire school system. (See Fig. 11.)

THE TEACHER'S FORUM

1. How did early explorers and settlers appraise our national resources? Why? What unforeseen factors upset their calculations and rendered their appraisal wrong?

2. Why did forest conservation receive attention before that of most other resources?

3. Automobiles are made from many natural resources, and by the aid of many more. In Russia, who decides how many automobiles will be built this year? On what can he base his decision? In the United States, who decides?

4. In a democratic economy, how do we decide whether we want more automobiles or more airplanes?

5. Which is theoretically capable of producing the greatest total satisfactions for all the people, democracy or dictatorship?

6. Who knows better what you want for dinner, you or the cafeteria dietitian? What implications does this have for a democratic society?

7. It has been said that the efficiency of totalitarian countries will compel us to adopt similar methods. Are their "total" methods of allocating resources to specific uses more efficient than our democratic methods based upon individual decisions?

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CHAPTER VI

A CONSERVATIONAL CLASSIFICATION OF RESOURCES

Conservation is often discussed as though it were a single large program applicable to all resources. When one attempts to formulate a conservational program, however, he quickly discovers that the same sort of proposals are not applicable to all resources. At once, the need for a *conservational* classification of resources becomes apparent.

INEXHAUSTIBLE VERSUS DEPLETABLE RESOURCES

After brief examination, it may be seen that all the materials, elements, and forces of the environment which man adapts to his own ends, fall into two major categories: (A) those which are *inexhaustible* and (B) those which are *exhaustible* or, more properly speaking, depletable. These in turn are divisible into subcategories. The *inexhaustible* resources include (1) those which can be improperly utilized and (2) those which cannot. The *depletable* resources, in turn, include (1) those which are permanently maintainable and (2) those which are not. If the classification is carried a step farther, the *maintainable* resources fall into two subdivisions: (a) those which are *remediable* and *renewable* under most conditions and (b) those which are not *renewable* and which become *irremediable* or *irreplaceable* if left untreated too long. Similarly, the *non-renewable* resources are subdivisible into (a) those which are *reusable* and (b) those which are not. Diagrammatically, these may be shown as follows:

RESOURCE PROBLEM CATEGORIES

- | | | |
|---------------------------------|----------------------|-------------------|
| | (1) Immutable | |
| A. Inexhaustible | (2) Misusable | (a) renewable |
| | (1) Maintainable | (b) non-renewable |
| B. Exhaustible or
depletable | | (a) reusable |
| | (2) Non-maintainable | (b) non-reusable |

SIX CLASSES OF RESOURCES

Thus it is clear that there are some six distinct classes of resources:

- Class I.* Inexhaustible and Immutable Resources. They include the ocean waters, solar power, wind power, sand,¹ gravel,¹ clay,¹ stone,¹ cement materials,¹ salt,¹ lime,¹ air, climate, gravitation.
- Class II.* Inexhaustible but Misusable Resources. They include water power, surface water bodies, area and space, geographic location, scenery² and land relief,² convenience and order in man-made structures.
- Class III.* Maintainable and Renewable Resources. They include timber, scenic beauty, human numbers, land fertility, ground waters, range grassland, a few fishes, and some wild animals.
- Class IV.* Maintainable but Non-renewable Resources. They include physical soil materials, human talent and genius, many forms of fish, wild animals, trees, shrubs, and wild flowers.
- Class V.* Exhaustible but Reusable Resources. They include gems, some non-metallic minerals, and most metals, such as iron, tin, copper, gold, and silver.
- Class VI.* Exhaustible, One-Use Resources. They include coal, petroleum, natural gas, helium, most non-metallics, and certain metals.

SIX REMEDIAL PROGRAMS

Each of these classes of natural resources possesses its own unique conservation problem or problems. Hence different methods and measures are required in any proposed handling of each class. This may be indicated as:

- Class I.* Inexhaustible-Immutable. The supplies are for all practical purposes almost limitless. Nothing which man does with such resources can have much effect—either good or bad. Such resources present practically no problem in conservation, at least not in our present civilization. About all man can do is to be

¹ These materials are, however, exhaustible locally. While the total world supplies are probably adequate, local conservation programs are in many instances urgently needed.

² Many minor aspects of scenery are certainly permanently depletable. In most instances, however, it is merely a matter of obstructing, obscuring, and defacing scenic resources, or of misusing resources of land relief.

properly thankful that such resources exist. Some local conservation measures are advisable.

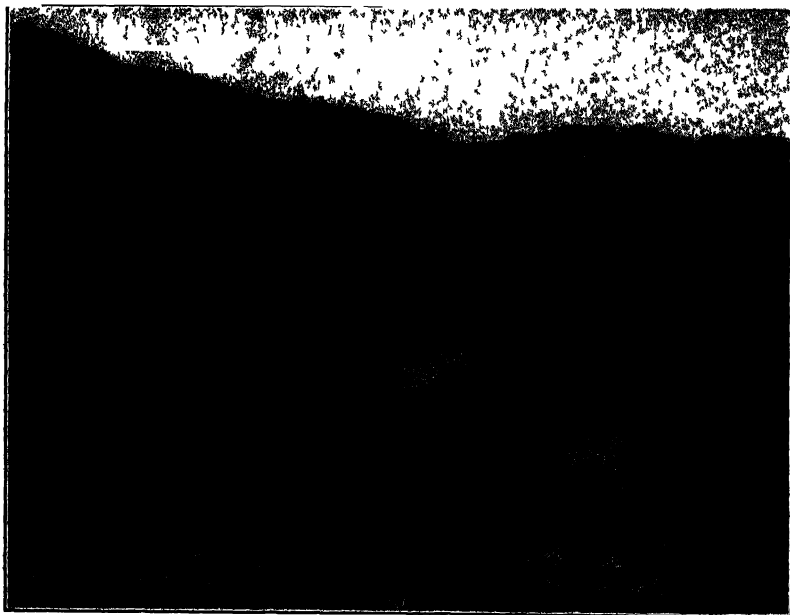
Class II. Inexhaustible-Misusable. Here again the danger of exhaustion is practically non-existent. The supply is nearly limitless in some instances; in the remaining instances the supply may be limited, sometimes even severely so, but the source of supply is permanent. Nothing man can do will bring an end to such resources, but man can, and usually does, use them so selfishly, unwisely, and heedlessly that he fails to derive the maximum good from them. The remedy is what is usually termed socio-economic planning, and the objective is to secure the wisest and fullest use possible.

Class III. Maintainable-Depletable-Renewable. These resources can be maintained permanently at a high level of usefulness, but they also can be depleted at a rapid rate. No matter how far depleted, however, some sort of range grassland, or forest, can be redeveloped; man power can always be re-established as long as one pair of young human beings remain alive; carp, rabbits, pheasants, and a few other very persistent biotic species can be restored as long as one pair remains; soil fertility can always be restored by fertilizing and manuring. Restorations of this kind are always painful, slow, exceedingly costly, and in the end usually not so good as the original. The necessity for such heroic measures should be avoided by intelligent beings by means of prompt remedial action. Following that, the remedy is proper use and replacement as used. This calls for what is commonly termed *physical resource planning*. (See Fig. 12.)

Class IV. Maintainable-Exhaustible-Irremediable. Resources of this kind can also be permanently maintained in productive condition, but they can on the other hand be exhausted and ruined forever. When the habitat of some biotic resources is destroyed, the species perishes to the last individual; some species are social and, when their numbers dwindle below a certain point, they die "en masse." Soil when once physically destroyed cannot be replaced, although mere soil fertility is readily replaceable, if one be willing to pay the price for doing it. Man power can be restored, but human genius and ability when once destroyed cannot be replaced. An inquisition or a mass execution of the abler elements or class sterilization in a population may, therefore, permanently disable it. A combination of physical planning and socio-economic planning is here indicated, with proper use and

replacement for physical resources, and some deep-seated changes in social and economic policies for our human resources.

Class V. Exhaustible-Non-maintainable-Reusable. Once extracted for use, the supply of these resources is never renewed. The day of exhaustion can be long postponed, however, by careful use, decreased waste, and restricted use. Many of these materials may



Photograph by the U. S. Forest Service.

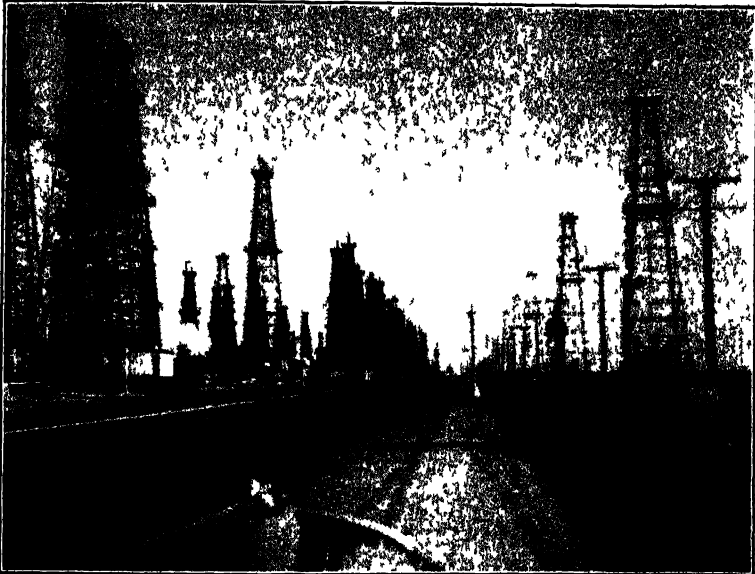
FIG. 12. A replanted forest in Colorado. The forest is a renewable resource.

be reclaimed and used over and over again, in some instances prolonging their period of service almost indefinitely. The remedy not only must be planned use; it must involve an increasing amount of government supervision and regulation as well.

Class VI. Exhaustible-Non-maintainable-Non-reusable. Once used, these materials are gone; once gone, they can never be replaced or even reused. The remedy is to see that waste is reduced to a minimum, substitutes employed wherever possible, and benefits extended for as long a time as possible—with ultimate exhaustion, of course, a certainty. In some cases, deferred use is indicated. In all instances, the elimination of competition in exploitation is imperative. (See Fig. 13.) This probably means

nothing short of the nationalization of such resources under a program of socialized control and administration for the general welfare.

The total program, therefore, involves physical planning and management for some resources, socio-economic planning for other kinds of resources, government regulation for others, and



From Conservation in the United States by A. F. Gustafson, H. Ries, O. H. Guise, and W. J. Hamilton, Jr., Comstock Publishing Company, Inc., Ithaca, New York

FIG. 13. A forest of oil derricks where one or two wells would suffice. Petroleum is a non-renewable resource.

national ownership and socialized control for still others. In all cases, it demands the development of local, state, regional, and national planning and conservation management by the American people.

THE TEACHER'S FORUM

1. Suppose a public-spirited mine operator wants to take out all the usable grades of coal simultaneously, when his competitors are only skimming off the "cream." Can he operate? Which exerts more control over prices, the social usefulness of a resource or the day-by-day competitive demand for its products? What are some results of this?

54 A CONSERVATIONAL CLASSIFICATION OF RESOURCES

2. Does planning mean "regimentation" as is often imputed?

(a) Give examples of planning which can bring about desired institutional changes simply by changing peoples' habits, forms of conduct, conceptions of value through *education*.

(b) Give examples of planning which merely develops *new institutions* (such as consumer co-operatives) within the existing competitive structure of society.

(c) Give examples of planning where the government contributes much in the way of statistical information, grants-in-aid, etc., without exerting any control.

(d) Give examples of planning where government ought to regulate in detail but not assume ownership. Are the railroads an example?

(e) Give examples of planning (as for instance, military affairs, manufacture of munitions, etc.) where the government ought to own and operate the enterprise.

3. The Mikado, in discussing a complete penal revision for Japan, suggested that it be based upon the principle of making the punishment fit the crime. Are there any implications in this for a national conservation program for the United States?

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CHAPTER VII

NEW IDEAS FOR OLD

The evidences of resource destruction and depletion cited in Chapter I indicate, when taken collectively, a fundamentally erroneous "way of life" on the part of the American people—a way of life eventually leading to economic decline and social ruin, and avoidable only by prompt and heroic measures. The problem cannot be legislated out of existence, because laws are ineffective or inoperable when they strike directly at a people's way of life, unless they are supported by popular ideas. The navigation laws in our colonial period, laws compelling return of escaped slaves a hundred years ago, or the national prohibition law in more recent days, all illustrate the truth of this statement.

The task facing the nation, therefore, is to get an entirely new set of ideas into the collective thinking process of the populace. Scientists already possess the necessary ideas; hence the objective is to transplant ideas from the mind of the scientist to the mind of the common man. Since the United States has no Minister of Propaganda (nor would we wish for one), the assignment clearly falls upon the schools.

THREE IDEAS

The first transplantable and cultivable idea is that *civilization rests squarely upon resources*, an idea which is neither appreciated nor held generally. It becomes self-evident, however, when we take the trouble to observe that our whole social order is derived from and rests upon a natural base of physical and biotic resources. Houses, ships, locomotives, telephones, asphalt streets, automobiles, factories, skyscrapers, microscopes, axes, pen-knives, or files are made out of physical resource materials. A suit of clothes, a cheese, a kilowatt of electricity, a lump of coke, an economics textbook, or a dose of aspirin is also made from certain natural resources and by the aid and cooperation of certain others. A social order is very largely the sum total of all these things. A group of people having only wolfskin clothes, straw huts, firewood, hoe cake and beans, and flint tools can-

not have much of a social order. But skins, huts, beans, and flints are themselves resources taken from the environment. Deplete or destroy these, and we have only man without huts, clothing, fuel, or tools, and no source for securing them. In such a state it would matter little whether men were fascist, democratic, theocratic, or communistic, or what was the institutional content of their social order.

Viewing society in this light, even the most rudimentary social philosopher concedes that human society arises through the geographical process of man adjusting himself to the natural environment and adapting its resources to his needs. A necessary corollary to this is that where resources are scant the social order must be meager, and where resources are rich and abundant the social order is likely to be opulent, active, and complex.

Why has not this dependence of society upon resources been made the center of popular attention, or received educational emphasis? The answer would seem to be twofold. First, the student of social science has been engrossed by the study of institutions and ideologies in society to the extent of overlooking the fact that the whole structure is made from natural resources. A Rockefeller Church in New York is only the profits from vast oil fields, just as a European cathedral is the sum total of the sous or kopeks wrung from the cabbage, potato, and beet fields of the peasantry. A Carnegie Library in Cleveland represents the profitable combination of Pennsylvania coal and Minnesota iron ore. A great university in Seattle is the distillate of Puget Sound fish, Cascade sawlogs, Yakima apples, and Palouse wheat. But little attention has been paid to these facts. Second, the original resources of our continent were so abundant as to stagger the imagination. The early settlers quickly evaluated these as inexhaustible and let the matter go at that. Ten generations of Americans have continued to regard their resources as so essentially limitless as to merit no attention. Consequently, they have not considered resources as anything meriting attention. It is time that we accord full attention to these vitally essential materials. (See Fig. 14.)

The second transplantable idea is that *the national greatness of the United States springs primarily from resources rather than from institutions*. Nature has distributed resources very unequally over the earth. Owing to the whims of the gods of biology, geology, climatology, hydrology, and other natural realms, some countries received few resources, others were richly endowed. The United States was more liberally endowed than any other country on earth, and hence we have become richer than any other nation, possess the highest standard of

living, use more luxury goods than all other nations put together, and transact one-half of the world's business.

Most Americans, including many educators, have attributed this to the profitableness of democracy and to the superiority of the "American Way." They have assured us that all we have to do is to hold

**ONE-SIXTH
OF A NATION
BLOWING AWAY!**

...over 200 million dollars last year. A huge sum! But ... but how does beer's share!

...AND BEER TAXES (*a million dollars a day!*) COULD PAY FOR SAVING IT

The Official Treasury
figures show Federal Ex-
penditures of
\$283,012,164.75
under the Conservation &
Domestic Allotment Act
for fiscal year 1939. Also
\$20,000,000.00
spent through the Soil Con-
servation Service.

FIG. 14. An advertisement used by the United Brewers Industrial Foundation during 1939. It indicates not only that brewing is one of the great national industries but also that the American people need to reconstruct many of their ideas about taxation and the expenditure of tax moneys.

fast to the "American Way" and we will continue to enjoy these things. In this connection, it should be pointed out candidly that democracy is pleasant but it so happens that it is not necessarily profitable. We may preserve and hold fast to the "American Way" forever, but this will not in itself insure the perpetuation of our prosperity. The two are simply not related to each other. Iceland is a wonderful country with unusually able people living under a democ-

racy even better than our own in many respects. It can never be rich, populous, or important; its resources are too slim. In one-fourth the national lifetime of Iceland, the less democratic United States has grown into the wealthiest nation on earth. This is true for the same reason that if a person has wood, iron, copper, gypsum, and cement materials he can build a house; but if he does not have these, he cannot build a house, nor can he build a second house if he uses up or wastes his materials in building the first house. If a people have the necessary resources they can build an opulent social order; if they waste their substance they cannot maintain or replace that social order. Nor can they, without abundant resources to exchange, secure needed materials from other nations through foreign trade. Even the "ersatz" commodities developed in Germany require basic source materials for their construction; they are not manufactured out of thin air.

The American nation consists of the descendants of some Europeans who, a few decades ago, were transferred from an old continent of meager resources to a new, unused one whose natural resources were the richest on earth. The transfer came just at a time when science and invention were really getting under way. The result today is 133 million people in possession of a dangerous plaything. This plaything is an amazingly productive but voracious technology. It is so effective that during the last century we have converted more natural materials into economic goods than during the entire prior span of human history. At the same time it has brought about a vastly greater degree of waste than ever before. Its very productiveness has dazzled men into looking at the result rather than the source and so we have been living far beyond our geographical income, eating into our principal.

In part, our national greatness is owing to a fine human stock and to superior social institutions. In part, it is referable to the fact that our political democracy has provided freedom for genius, inventiveness, and human initiative to go ahead without restriction. But in much larger portion it is the result of something for which the American people can claim no credit—the possession of a disproportionately large share of the world's resources.

In inimitable fashion, Stuart Chase writes in the preface to *America Begins Again*:

While Fourth of July orators have been pounding the table until the water pitcher rocks, declaiming the glories of the Republic and the indomitable spirit of the pioneer, three billion tons of rich top-

soil have gone tumbling into the oceans every year. . . . Instead of wrapping ourselves in the flag and shouting what fine boys we are, we ought to be down on our knees at the mourners' bench saying what miserable sinners we have been.¹

The third idea which should be transplanted and nurtured is that *it is possible to preserve the physical basis of our social order, if action is not delayed too long, through a program of conservation.* This is not a simple program but a variegated one which ramifies into every field of science, industry, and social behavior. For our inexhaustible resources it calls for the substitution of utilization for non-utilization, of full use for partial use or misuse or waste, and of social use for selfish use. For our replaceable resources it requires the initiation of remedial action before it is too late for such measures, and for the setting up of safeguards against future depletion. For our exhaustible resources it demands that some balance be struck between the needs of our generation and those of generations to come. Furthermore, in connection with those resources which are ear-marked for our own generation, it involves substitution of inexhaustible or replaceable resources wherever possible, for deferred use in some instances, and for fuller utilization through community, state, and national planning in all instances.

TWO ADDITIONAL IDEAS

An additional idea of great moment is *the notion of personal responsibility in public affairs.* It is truly astonishing how little attention may sometimes be given to matters of great national importance. What is everybody's business promptly becomes nobody's business. But resource waste is assuming such serious proportions that it must soon be made somebody's business or else the United States will speedily be a dwindling country. When the average citizen is confronted with a big social problem he usually thinks, "Let the Federal Government do it." In many cases this may be feasible, but there are certain drawbacks to handling this problem that way. Natural resources lie at the very root of our economic process, and any program of conservation must be intimately integrated with our whole social and economic fabric. For government to intervene forcibly into our economy on such a vast scale as would be necessary suggests the complete negation of democracy. At the very outset, then, we

¹ Stuart Chase, in Foreword to K. Glover's *America Begins Again*, McGraw-Hill, New York, 1939, p. ix.

prefer to reject tentatively such a solution, but this leaves conservation as far from being realized as ever. Americans must be convinced of the necessity of their shouldering responsibility for participating in public problems. The "God-given right to freedom" implies always a "God-given responsibility" for one's own welfare, public as well as private.

A second idea of considerable importance is that *democracy must learn to entrust its welfare to the hands of scholarship*. The people must at all costs retain in their own hands the power of political action and control, but on matters of economic and social policy they must no longer rely on spontaneous mass ideas. Democracy has already learned to entrust one portion of its liberties to American legal scholarship. It must similarly learn to entrust its physical and social scientists with still another portion.

The White House Conference of 1908 marked the first time that the nation's politicians had met our scientists and educators on an equal footing. Such a move had previously been almost unthinkable. Many of the scholars' recommendations were followed, but many more were rejected. The widespread use of scientists and university professors as executives, advisors, staff researchers, and consultants in Franklin Roosevelt's "New Deal" Administration marked a second period of governmental utilization of scholarship. The public reactions against the use of such experts show clearly that a large part of the American people still do not think it is safe to trust the opinions of a well-educated person. During the political campaigns of 1936 and 1940, many newspapers and magazines were filled with cartoons ridiculing the scholar and depicting the cap and gown as a symbol of incompetence in public affairs. Editorials and articles also actively propagandized against the scientist and professor in government.

Admittedly, the scholar is neither omniscient nor perfect, but to believe that he knows no more than an uneducated person is hardly logical. To believe that he knows less about a problem which he has studied than does the layman who has not studied it defies all reason. Several times the American people have nominated for president, and twice elected to that highest office in the land, men with almost no education. All this indicates that Americans in general still place more faith in political organization than in educated intelligence. This is peculiar to say the least, because the United States annually spends more money for education than do all other countries of the world combined. In order to be logical we should either stop spending so much for education or else be willing to trust the products of our schools. The use and conservation of resources are one field where it

is becoming more and more imperative that we trust expert opinion to outline the major lines of public action.

THE TEACHER'S FORUM

1. If our competitive system is as full of faults as we have indicated, why should we bother to try to preserve it? Does it offer something of fundamental value to democracy? What?

2. If a professor of physics discovers a new law of nature, and if one of his engineering students is thereby enabled to make a new gun, tank, dye, or fertilizer, why should society permit itself the doubtful luxury of calling that physicist an "impractical academician"?

If a biologist discovers a law or principle of heredity whereby the cattle of the nation are improved, their butterfat output doubled, and the national income increased by 10 per cent, why should those same people accuse a biologist of being vicious or "irreligious" if he should advocate the application of simple eugenic measures to *human resources*?

Do these examples indicate a readiness to profit materially from science but a fundamental unwillingness to adjust ourselves intellectually to scientific truth? What can be said for a society which is eager to accept new gadgets but not the scientific truths which made them possible? Weapons are merely gadgets. Have modern man's weapons outrun his acceptance of scientific truth and moral obligation? Is a nation which has poison gas and trinitrotoluene, but which rejects birth-control contraceptives, a menace or an asset to civilization? Is the possession of agricultural machinery without a sense of moral obligation to preserve our soil a similar menace?

3. Why do we spend so much time studying institutions and pay so little attention to the resources which support them? What general fallacious assumption probably underlies this? What is needed?

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CHAPTER VIII

OBJECTIVES IN CONSERVATION EDUCATION

The general aim or purpose of conservation education is to bring about a situation where society will consciously adopt, enforce, and maintain a rationalized and, as nearly as possible, a self-perpetuating program of resource use. This is not a program which can be achieved by fiat; rather, it is one which can only be attained by changing our social philosophy through education. If such conservation education is ever to be successful it must realize some very definite and deliberate objectives. No one has, to date, formulated any set of objectives, but this is no reason why we should not at this time attempt to state tentatively a list of such objectives.

CONSERVATION'S FOURTEEN POINTS

1. *To develop a popular understanding of natural resources.* The average man has at best only a rudimentary notion of what resources are. Even the supposedly educated man may have no more than a vague idea that wood is cut from some remote forest, iron and gold are dug out of the ground, petroleum is spouted mysteriously from wells, that some waters yield salmon, and that these substances are used more or less incidentally in the economic world. This idea should be enormously expanded, for natural resources include an almost endless list of utilizable materials from climate, soil, ground water, surface waters, et cetera, at one end, thence through all the physical and biotic materials, to landscape beauty, recreational resources, and geographical location at the other end.

The citizen should be made aware of these, know what role they play in building civilization, how they are used, and into what classes they fall as regards their abundance and exhaustibility. (See Fig. 15.)

2. *To create geographical habits of thinking.* There is an almost universal habit of regarding our social and economic institutions as purely man-made structures. And yet the Chase National Bank, Columbia University, Saint Patrick's Cathedral, the Creer Library, the Mellon Art Collection, and the C.I.O. have all taken their origin and continue to operate because and only because of the ceaseless exploita-

tion of natural resources. Intelligent geographical thinking requires that we recognize that all such institutions (not to mention all social and political events also) are related to resources. To think of them together, as inseparable phenomena geographically related, will yield a perspective which our citizenry does not now possess.

3. *To sensitize the individual to evidences of resource waste.* Nowhere in America has the writer yet observed a single community where there were not obtrusive evidences of resource waste, destruction, unwise use, and depletion. Not even among the stable "Penn-



Photograph by Soil Conservation Service.

FIG. 15. Alamance County, N. C., pupils examine the decomposition of forest litter and see the protection which it affords the soil.

sylvanisch Deutsch" communities are these evidences lacking. For generations the American pioneer fought the forest, destroyed wild animals, drained lakes, and built hideously and hurriedly, all in the name of developing the country. Hence most modern Americans are so "conditioned" to waste and disfigurement that it either escapes their notice altogether or is accepted as inevitable. To one who has seen a Japanese, Hollandish, Thuringian, or Swiss landscape it can never be regarded as inevitable. Moreover, to one who has seen the ruins east of Antioch or the devastated areas of northwest China, northern Africa, or the American "South" it appears that destructive exploitation is more suicidal than inevitable.

4. *To correct the belief that resources are inexhaustible.* The writer grew up in a society where the inexhaustibility of our natural wealth was taken for granted. This is a heritage from the days when a handful of colonists looked westward at a vast uninhabited continent, ap-

praised it, and concluded that here were land, fish, game, timber, minerals, and water power in such unlimited quantities that we would never see the end of them.

Today, 300 years later, the prospect looks quite different for a mature nation of 133,000,000 people. Although one does encounter the expression "inexhaustible resources" still, even among intellectuals and in political high places, one hears it less and less frequently these days. The idea must be rooted out with all possible speed.

5. *To promote the idea of trusteeship in place of ownership.* The longest-lived among us are here but a few years, and, no matter to how much of nature we may secure legal title, we cannot "take it with us" when we die. Hence, one is forced to conclude that we do not actually "own" anything. Mankind has already been here approximately one million years and seems destined to continue for several million more. The implication of this is that ownership of the earth and its resources is vested in mankind or society rather than in individuals. We are, therefore, trustees or stewards rather than owners and should be taught to give some consideration to the rights of the generations of trustees yet unborn.

The idea that we are stewards of the land rather than outright owners is not a radical new idea. It is an old foundation idea in civilization, no matter how often and for how long it may have been forgotten. Written nearly 1,500 years before Christ, one of the books of the Bible states: ". . . the land is mine; for ye are strangers and sojourners with me" (*Leviticus XXV, 23*). No statement could be clearer.

6. *To dispel the notion that science is a substitute for resources.* It is commonly believed that, if we use up certain materials, the scientists and inventors will provide new substances. Almost universally, by all ranks of men from unskilled laborers to university students, this is regarded as an axiomatic truth. It is suggestive to note that, while the layman thus puts his trust in the bounty of science, the scientist himself has no such conviction. Instead, he will probably point out that such a belief is perhaps the greatest single hindrance to the conservation movement today.

Science has substituted kerosene for whale oil and steel for many uses of wood, but this means only substituting exhaustible and irreplaceable materials for replaceable ones. It has swapped us Diesel oil for coal, but this means a limited material for a fairly abundant one. It has taught us how to re-use scrap iron, but it has given us a luxury demand wherein a poor man may buy an automobile containing more iron than his grandfather used in a lifetime. Science has given us an

imposing array of substitutes for many materials, but, for every substitute discovered, two or three new uses have been invented.

7. *To explode the idea that foreign trade can compensate for exhausted resources.* We are suffering from a chronic attack of the world commerce idea. The belief is widespread that if we exhaust certain materials we can import them. But from where? Japan and Germany raise fish in ponds like chickens; France and other western European nations cultivate an inadequate supply of timber on a careful crop basis; China is mostly deforested; the Mediterranean countries are very largely treeless. The world already buys iron, copper, petroleum, phosphate, and lumber from us in huge quantities.

The resources of Russia are undoubtedly large, but her industrialization is just getting under way. Long before she can have reached maturity her resources will have proved inadequate for her own needs. The world commerce idea, indeed, holds out little hope to any nation which is unwilling to conserve its own riches.

8. *To teach an appreciation of alternative land uses.* For more than a century, the American people regarded agriculture as the highest use of all land. A piece of land was thought not to be fulfilling its manifest destiny unless it was under cultivation. As a consequence, all kinds and grades of land were cleared and planted in crops. The result was, in countless instances, ruin and poverty. An acre of fine level Iowa land, if planted to black walnut timber and managed scientifically, would probably yield under present-day conditions as much income as if planted in corn. If this is true of fine farmland, how much more true is it in relation to land which produces only poor farm crops. The American people need to learn that the highest usefulness of many lands is to produce grass or forest or wild animals or recreational services.

When large cities began to develop, Americans changed their general idea about land so as to permit one exception in the case of urban areas. Here the highest destiny of land was considered to be reached when it was completely covered by stores, factories, houses, or asphalt streets. 'This has produced an equally ruinous set of results. In this case it has not ruined the land, but instead has ruined human beings. To this ruin, most city dwellers are insensible, because they have been "conditioned" to it since birth.

In comparison to rural land, urban land is not land at all—it is merely space. There are many who argue that it should, therefore, be regarded simply as a public utility like water or electricity, or telephone service. Our policy in America, however, is to treat it as a speculative commodity of high marketability, and accordingly tax it

severely. For these two reasons, urban land is subdivided into minute pieces. Upon these minute pieces of space we let selfish private interests design and build our cities, although such private builders have no social and civic training which fits them for such tasks. Homes are crowded so closely together that there are no facilities for health, recreation, or natural work experiences. This provides no equipment for rearing and training children, and hence there is an ever *decreasing* number of children born in cities. Indeed, no city of 100,000 population or over is holding its own in birth rate. Tremendous costs for schools are engendered by the need to offset the city's disadvantages for the child. Every city is also witnessing an appalling increase in juvenile crime and delinquency, and each child conviction costs the taxpayers between \$5,000 and \$10,000.

In addition to this, the city makes necessary stupendous transit and traffic-control expenses. Insurance rates and public-health costs mount ever higher. There is no profit in this for anyone in the long run, particularly since every American city has already been rebuilt three or four times, each time with a dead loss in all previous buildings. Thus cities are veritable pyramids of resource waste.

9. *To create a new evaluation of ownership.* Almost universal is the belief that the highest form of land ownership is the possession and holding in fee simple by the individual. For more than one hundred and fifty years this has been evidenced by our hasty, ill-considered, almost feverish efforts to get the public domain into private hands. What has been true of land has also been true of all other natural resources. Our national philosophy seems to have been that land and other materials are failing to fulfill their destinies until got into absolute and unrestricted private ownership.

Some Americans are now coming to realize that various forms of public ownership are higher and more socially useful forms and should therefore take precedence. Here is an imperative task for re-education of the nation.

10. *To build a new social philosophy of rights.* Legally, one has the right to do about as he pleases with any gift of nature which he may happen to "own." Soil may be destroyed, waters polluted, natural beauty defaced, and public convenience destroyed because of individual choice or desire. The resources of a community may be gutted and drained off to make profits for a few people located far away, leaving that community economically stranded.

Personal rights have received a vast deal of attention all through American history. More recently the expansion of public jurisdiction

and eminent domain and the rights of the state have also received increasing notice. Meanwhile, the rights of society thus encroached upon from both ends have been largely overlooked. The schools need to teach the people that no person or group or community or governmental unit has a "right" to use any resource in a manner inimical to the general rights of society.

11. *To evolve and employ a new biological premise in education and social reward.* Our present educational practices are based upon ancient and almost universally held biological assumptions. The way we reward members of society socially and economically is also based upon premises which no reputable scientist believes today. Our system of aids and rewards operates to make the hereditarily dull individuals breed faster and the hereditarily able and gifted reduce their reproduction rate almost to the vanishing point. This is like skimming a pan of milk repeatedly and still expecting more cream to rise. Worse than this, many people fondly believe that blue milk can be converted into yellow cream simply by education. The conservation of our human resources demands a new basis of operation.

12. *To obtain new laws and regulations.* Our present laws were not framed so as to protect resources, to safeguard the public domain, or in many respects even to promote the general welfare. These laws do not achieve conservation; they do not even encourage it. In fact, in numerous instances, they do not even allow it. One must, therefore, conclude that such laws are defective. Laws and regulations are almost always outgrowths of customs and practices in society. Perhaps we need new customs even worse than we need new laws and regulations.

13. *To develop new customs and practices,* which would replace long-established but defective mores and folk customs in dealing with resources, which are now universal in America. Some of these destructive and undesirable habitual practices are:

Subdividing and cultivating land rectangularly.

Burning over grassland, woodland, and idle areas each spring.

Despoiling trees, shrubs, and flowers for trivial reasons.

Dumping trash and rubbish into ditches, roadsides, and other unoccupied places.

Treating all edible wildlife as legitimate prey for man.

Using creeks and rivers for sewers.

Despoiling landscape beauty for "practical" reasons.

Allowing our communities to be designed by ignorant or self-centered real-estate dealers.

Allowing beaches, waterfronts, and other natural recreational resources to be pre-empted by private ownership, etc., etc.

Customs and practices, it must be remembered, invariably rest upon popular ideas. Clearly we need some new popular ideas.

14. *To cultivate a new community ambition.* The ambition of nearly every community from Pumpkin Center, California, to New York, New York, is to grow and become large. "Watch X-ville grow" is the slogan of most chambers of commerce. Everywhere there is worship of the great god growth. But community growth means expanding exploitation of nature and increasing concentration and deprivation of human beings. Everything which can be done to cause community growth has been attempted, but almost nothing has been done to make the community a better place in which to live. Everywhere, city planners complain that they can get no public support for even the most rudimentary social improvements. We need not to exploit more resources but to learn to use wisely and more fully those already being exploited.

THE ELEVENTH COMMANDMENT

The United States has grown to astonishing size and economic power in an amazingly short time, but we have paid and are paying a ruinous price for this growth. As Edwin Reeder points out,

. . . fortunately it is not too late if we will mend our ways at once. Conservation measures and wise use will rebuild our forests, rehabilitate our land, clear our streams and preserve minerals for many years to come.

In an autocracy such measures would be easy. The dictator would simply call in the experts; they would tell him what should be done, and he would immediately issue the necessary orders. But democracy does not work that way. The people as a whole must want things done or they will not be done. Public opinion in the last analysis rules in a democracy, and it is the task of the schools to help insure that we have an intelligent, enlightened public opinion. We will conserve our natural resources when the schools present the facts which show its necessity, for then when our children become voters they will demand conservation legislation.¹

If our basic equipment of land, water, minerals, and human resources is fully husbanded and put to work in a completely conservational pro-

¹ E. H. Reeder, "Conservation and Democracy," *Social Education*, Vol. IV, No. 7, November, 1940, p. 455.

gram, America has the capacity to support a greatly increased population on a wholesome standard of living for countless centuries. The success of the conservation movement toward attaining such a program implies a reversal of popular attitudes which have been held for nearly two centuries—and which therefore are firmly established in the American mind.

Walter C. Lowdermilk in a radio broadcast from Jerusalem in June, 1939, suggested that mankind really needs an eleventh commandment to supplement the Ten Commandments of the Mosaic Law. Such a commandment, he said, should be phrased somewhat as follows:

XI. Thou shalt inherit the holy earth as a faithful steward, conserving its resources and productivity from generation to generation. Thou shalt safeguard thy fields from soil erosion, thy living waters from drying up, thy forests from desolation, and protect thy hills from overgrazing by thy herds, that thy descendants may have abundance forever. If any shall fail in this stewardship of the land thy fruitful fields shall become sterile stony ground and wasting gullies, and thy descendants shall decrease and live in poverty or perish from off the face of the earth.

And he added:

But no such commandment has been a part of man's attitude toward his occupation of the earth except in very limited areas. Man has generally been an exploiter, despoiler, and destroyer of the physical, plant, and animal resources of the earth. He has brought upon himself the curse of destruction, impoverishment, and desolation in vast areas.²

Our children must be instructed in these facts, even though many of them may be unpleasant and difficult. As Edwin Reeder points out, ". . . our teachers must be fired with a new zeal to study and teach the truth. We must not kill private energy and initiative. But we must so regulate it that our heritage will be conserved for the good of all. Our children must not rise up to call us cursed."³

THE TEACHER'S FORUM

1. Why has the conservation of renewable resources already received considerable attention, whereas the more serious problems of the non-renewable resources have as yet remained almost untouched? What factors are in-

² W. C. Lowdermilk, "The Eleventh Commandment," *American Forests*, January, 1940.

³ E. H. Reeder, *op. cit.*

volved? Why has most attention of all been directed toward such minor points as not disturbing wild flowers, removing ugly signs, beautifying yards and shrubbery, and not catching more fish at one time than the fisherman can eat?

2. Are the major problems of conservation the results of our present careless behavior and unbeautiful folk ways, or of our economic ideas? When a teacher attacks the former, how much criticism is aroused? The latter? Is the issue of academic freedom involved?

3. What are the factors which are today the greatest obstacles to conservation? Which of these can be dealt with first? Which must be attacked last? What groups of people are most opposed to conservation? Why? What groups are most favorable to it? What groups are indifferent?

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CHAPTER IX

A NEW SPIRIT IN THE SOCIAL STUDIES

The present pattern of resource use in America is so faulty as to promise a gradual but inevitable decline in national well-being. To this general situation there are three possible ways for Americans to react. First, we can agree with that rather gloomy philosopher, Oswald Spengler, that these disturbing symptoms are merely preliminary stages in the inevitable desiccation and dwindling of a civilization (our own in this instance); second, we can pass the problem on to the so-called practical politician, who will levy taxes and put the "practical" engineer to work doing something concrete; or third, we can turn the light of investigation and inquiry upon it, and incorporate it into an educational program.

The first would obviously be a defeatist attitude; the second would put unwarranted faith in our democracy's ability to solve by collective action something which we have not even taken the trouble to understand individually; the third would dump the matter squarely into the laps of the social scientists. This is not a pleasant and easy-going generalization. Were its full import appreciated, a veritable revolutionary change would take place within our whole educational structure, for it implies an enhanced importance of the social sciences far exceeding anything now existing or contemplated in our present educational machinery. It would require, moreover, a veritable house cleaning within the social studies themselves and considerable change in their methods of investigation and points of view.

FUNCTION OF THE SOCIAL STUDIES

In the modern school, all subjects—the sciences, the tool or skill studies, the arts, literature, and the social studies—share the primary task of adjusting the pupil to the society in which he lives. It is upon the social studies, however, that the major task of interpreting and analyzing that society devolves. What is taught in those subjects and the purposes for which they are taught, therefore, are of the highest importance.

In the elementary school, three of the seven social studies are almost universally taught—history, geography, and civics. In the secondary school two additional ones are frequently present—economics and sociology. The last two—anthropology and social psychology—appear only at the college level. Those which are universally present in the elementary school are so significant that we may well examine them, at least very briefly, as to both general content and intent.

HISTORY

The usual practice is to teach American history as the story of man's triumphal march westward across the continent—the conquest of inventive man over nature. Actually it is fundamentally nothing of the sort. Rather, it is a long heartbreaking series of successes and failures in the adjustment of a people rapidly expanding into a series of varying environments. At every step man wrestled with nature, and usually gave in—at least partially. Through each step, the history of the American nation is to be told in terms of man's use of the resources and materials of nature. (See Figs. 1, 2, 3, 13.)

Not only the history of the United States but also the whole history of the western world revolves about the story of the human use of resources. Occidental history is, from this standpoint, divisible into three great periods: (1) the period of meagerness, (2) the period of abundance, and (3) the period of readjustment.

The Period of Meagerness

All through what we have been accustomed to call the ancient, medieval, and early modern stages of the western world, Europe was, in terms of society's ability to produce food, shelter, clothing, fuel, and other things for human support, greatly overpopulated. Overpopulation is, of course, never measurable in terms of the man-land ratio. Instead it is a relative and varying matter resulting from the operation of an equation consisting of population, natural resources, and the technological equipment then in existence for reshaping resources into human necessities. Through these many millennia of time the people were poor and land hungry, the standard of living low, and the average life span short. Misery was accepted as the inevitable lot of the common man. Inventions and improvements were made, of course, but whatever advantages they conferred were rapidly swallowed up by an almost immediate increase in the population. All through these millennia of privation there were occasional waves of monasticism. Large numbers of people withdrew from participation

in the economic life of a world which offered so little reward for competitive struggle and sought meager security within walled cloisters. In the world outside, the king or noble usually had fewer luxuries than an unskilled laborer enjoys today. It was indeed a period of meagerness. It ended, however, in the year 1492.

The Period of Abundance

The Columbian discoveries opened up a new and unused world and dumped it in Europe's front yard. A highly selected group of Europeans migrated to America and founded New England, New Spain, New France, New Netherlands, New Sweden, and finally Alaska and the Russian River Colony. On their foundations the United Colonies arose, and later the United States of America was welded from these colonies.

The population pressure in Europe was relieved somewhat by emigration, but even more so by the huge stream of resources which flowed back to that continent. It is extremely enlightening to note that great fleets of European fishermen were anchored off the American shores within less than ten years after Columbus's first voyage.

In America, the population increased at first slowly, and then at a bewildering rate. It began to eat rapidly into natural resources, accumulating such a surplus that mechanical improvements could easily be financed. Each new improvement merely accelerated the process. Fortunately, the resources were rich and abundant—extensive forests and grasslands, fertile soils under a wide variety of climates, vast waters, unbelievable amounts of minerals and other raw materials. As J. Russell Smith writes in *Men and Resources*: "The European colonists found in North America a continent with a greater variety of resources than any other continent possesses. . . . Because the colonists in this continent of riches thought that the resources were endless, the American people became wasters, the greatest wasters in the world." What ensued may without exaggeration be described as a four-hundred-year orgy of waste—a veritable Roman holiday.

Most Americans now living grew up within a national psychology of "inexhaustible resources." The public had never heard anything else until Theodore Roosevelt's White House Conference in 1908. One still hears that expression occasionally, but American leaders in general no longer use the term very often nor very vociferously.

The Period of Readjustment

The second resources period of occidental history ended during the years 1908 to 1910. The last trickle of "movers" in covered wagons

died away in 1907 and 1908. The remaining coal, phosphate, forest, and water-power lands in the public domain were soon withdrawn from private entry. Homesteading continued for a time, but the land available was either marginal or submarginal, or else it required expensive reclamation. The period of abundance was over. Since 1910, man has entered a period of readjustment. Actually it is a "period of choice." Man must make a choice between continued waste with eventual return to meagerness on the one hand, and resource conservation and planning with sustained well-being on the other. Any history teaching which does not constantly teach this essential intellectual truth is unreal to say the least.

GEOGRAPHY

Geography is the study of people in relation to their environment—that is, a study of the human use of resources. In every locality, there are several classes of resources present, as soils, waters, minerals, locational advantages, climate, and topographic features. Man exercises a wide latitude of choice in his geographic use of these resources, depending for his decision upon a combination of immediate necessity, historical background and heritage, cultural level, deep-seated folk behavior, and arbitrary choice and accident. Certainly no two human groups would make identical use of the resources of any environment.

The human use of Manhattan Island through three hundred and fifty years illustrates this quite graphically. The Amerindians used it for hunting and fishing. The Dutch used it for fur-trading and farming (bouweries). The English and Americans used it for commerce and fishing. Then large masses of foreigners came in and manufacturing developed after 1860. Today commerce and manufacturing continue, but the island has become the greatest financial center of the world. Obviously the human use of resources has shifted several times. We, therefore, say that the geography of Manhattan Island has changed from time to time, even though the physical environment (the physiography) has remained fundamentally about the same.

Man's use of resources is often not what it should be; *use* is frequently misuse. Physical resources are wasted, depleted, or destroyed. Biotic resources are not protected, even exterminated. Scenic values are defaced. Human resources are exploited or neglected. Communities are allowed to grow into wasteful and inconvenient patterns. Since geography is the study of man's adjustment to his environment and the use of its resources, it is but one step farther to the discovery of where that use is misuse. An additional step is the formulation of

a plan for improving that use. Anyone who doubts that our human geography can be improved is simply one degree less blind than the person who fails to see that our present human geography is full of faults. (See Figs. 4, 9, 14.) Geography and conservation are simply opposite sides of the same thing. Geography is the study of things as they now are; conservation and planning are the study of things as they could and should be. Conservation, therefore, is applied geography.

Any geography of the United States which is not organized and taught about the conservation motif is, therefore, very feeble and ineffectual stuff. The duties and opportunities facing teachers of geography are fully as real and even more direct and immediate than those facing the teachers of history.

CIVICS

There has been recently a growing emphasis upon civics in public education. Just what is civics? Is it learning the state constitution, or how laws are passed? Is it learning how the milk supply is procured, or about the work of the fire and police departments? No, it is primarily an imparting of that knowledge and a cultivating of those judgments which make more alert and discerning citizens.

Is a person a good citizen who knows all about our laws, public officers, and political machinery, but who is ignorant of the use of resources, their waste, abuse, neglect, or destruction? Three-fourths or more of our laws deal with, or bear directly or indirectly upon, the use of resources. Can one vote intelligently or help choose representatives who in turn will vote upon such matters if he is uninformed upon the basic issues?

Do we realize that every institution—the First National Bank of New Orleans, the Yacht Club of Seattle, the Mellon Art Gallery, the High School of Wichita, Kansas, the Masonic Lodge in Anita, Iowa, and the Desert Sanitarium in Tuscon—are supported by resources? Do we realize that a large proportion of our resources are being wasted, and often stolen from beneath our very noses?

Are we indifferent to floods in Louisiana, to forest fires in Oregon, to the waste of coal in Illinois, to the depletion of oil in Texas, or to the ruin of soil in Georgia or Oklahoma? Do we see that the values of human living are being destroyed all over the nation by allowing self-centered, socially ignorant realtors to design our towns and cities in such manner as to make them unfit for the next generations of

Americans, and, what is worse, to freeze them for all time into such patterns?

Are we willing and anxious to face facts? In April, 1940, a well-known radio commentator complained about the appearance of books portraying the seamy side of American life and condemned authors who expose poverty and human distress. The implication of such comments is that we are slandering America if we print disagreeable truths



Is the Goddess of Grime Our Civic Ideal?

Columbus Evening Dispatch, January 21, 1933

Courtesy of the Columbus Evening Dispatch.

FIG. 16. This illustrates one out of the many results of our lack of civic responsibility.

about her. (See Fig. 16.) Millions of Americans will agree with this commentator that to be good citizens we should shut our eyes to unpleasantness and keep our minds sunny by thinking about pleasant things. Walter E. Myer, however, very cogently asks, "But do we serve the United States by this kind of myopic smugness? Or do *Grapes of Wrath*, *Tobacco Road*, *The Plow That Broke the Plains*, and so forth perform a civic service?"

During the last seventy-five years or so, our rate of resource exploitation has mounted alarmingly, surpassing that of all previous generations put together. J. Russell Smith has called this "thoughtless waste-

fulness." Gifford Pinchot termed it "wilful waste leading to woeful want." Clarence I. Hendrickson suggested once that perhaps it is only "Rugged Individualism." We shall come closer to the truth, however, if we recognize it for what it really is—ignorance. We have been like the cow who accepts without any reflection whatsoever the bran and fodder which are brought to her—wasting most of it while she eats what she wants.

From the standpoint of civics, resource waste and misuse are obviously everybody's business since they bear directly upon the national welfare. But how many of us are prepared to make it our business individually? Was the *Saturday Evening Post* editorial writer correct when he declared that in the last few decades, and particularly since 1932, we have seen "the beginning of a headlong flight from individual responsibility"?¹ The major task facing the teacher of civics is to educate our young to recognize and assume individual responsibility. All this is simply to ask for an entirely new spirit and orientation in the teaching of the social studies in our schools.

THE TEACHER'S FORUM

1. What would be the relative merits in teaching history from the standpoint of the three periods suggested rather than those commonly designated by the terms: ancient, medieval, and modern? Do they coincide as to dividing points or terminal dates? Why?
2. Give reasons why we emphasize constitutional law, public functions and offices, political institutions, and human rights in civics instead of public problems and civic obligations?
3. Why is ecology or geography much neglected in American education? What are some of the results of that neglect?

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¹ Editorial page, *Saturday Evening Post*, July 6, 1940.

PART II

OUTLINE OF RESOURCES, PROBLEMS, AND PROPOSALS

INTRODUCTION

The nine chapters of Part II which follow provide, collectively, an outline of a course in conservation of resources. The emerging stream of conservation literature has already grown so large that it is becoming increasingly difficult to compress even its salient facts into one volume. Moreover, to attempt to do so in a book of this kind would in many ways seem to be undesirable. A staccato summary of basic facts, challenging problems, and proposed programs of social action for each major group of resources is, therefore, presented. This is designed to orient the teacher, but to leave him free to adapt his subject matter to the desired teaching level. To the end of each chapter is appended a list of references to elementary, secondary, and college textbooks in the subject matter of conservation. From these the teacher may select the one applicable to the level of his class. Thus each chapter should serve the purpose of a teacher's manual or guide for the teaching of the particular group of resources treated. It is obvious that the minimal basic facts, problems, and proposals which the teacher must possess as a background are the same for teaching at all levels.

CHAPTER X

SOIL—ORIGINS, PROBLEMS, AND REMEDIES

I. Aims of Study.

1. To study the nature of soil and its importance to man.
2. To learn how man in America has settled the land and the kinds of land use he has developed.
3. To ascertain the principal soil and land problems and the extent of damage done to our soil resources.
4. To learn what remedies are needed to deal with the general problems of land and soil.

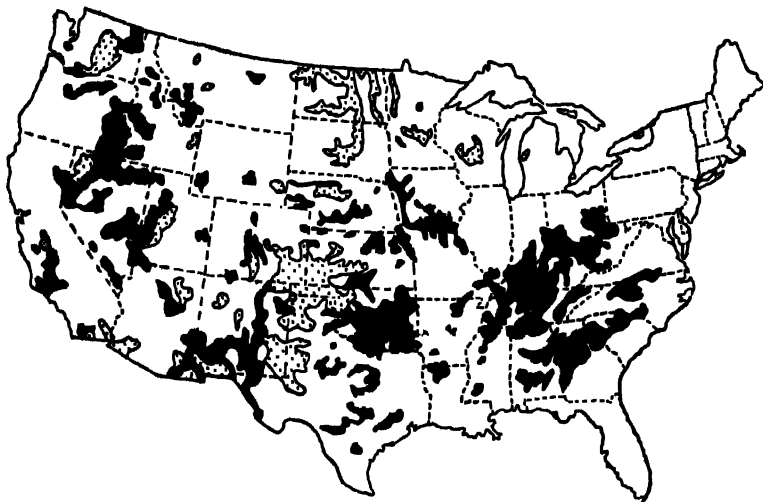
II. Generalizations.

1. Soil is the primary source for nearly all food, almost all textiles, and a considerable portion of our other raw materials. This makes soil of equal importance to rural and urban populations.
2. The amount of *good* soil in the United States is decidedly limited. This is likewise true of the world in general. The total soil area of the United States may be classified according to quality as follows:

Grade I (excellent)	5%
Grade II (good)	11%
Grade III (fair)	18%
Grade IV (poor)	19%
Grade V (not fit for farming)	47%

3. Man has exploited or utilized land very carelessly and destructively. Some 50,000,000 acres have been completely devastated within the short span of a few generations. (Japan, a nation of 65,000,000, possesses only about 17,000,000 acres of arable land all told.) In addition to this, another 50,000,000 acres are almost destroyed; another 100,000,000 acres have had the top soil about stripped off; and still another 100,000,000 acres are already in bad shape. (See Fig. 17.)

4. Soil wastage and exhaustion continue at a rapid rate: nearly 3,000,000,000 tons of soil each year are lost through erosion; 125,000,000,000 pounds of plant food are also lost annually from the soil.
5. Considerable numbers of people have settled upon poor land and are now cultivating soils unfit for agriculture. This causes poverty and suffering as well as soil destruction.



Drawn by G. T. Renner

FIG. 17. Areas in which most of the soil has been either severely damaged or completely destroyed by erosion. Black—sheet erosion and gully erosion. Dotted—wind erosion.

6. Soil losses must be stopped if the American people are to be fed adequately in the future.
7. It is our right and our duty to have our soils kept in good repair and maintained for permanent production.

III. The Soil as a Resource.

1. Natural processes in soil building.
 - (a) Weathering and additions of organic matter.
 - (b) Transportation and deposition. Wind, water, glaciation.
 - (c) Time. 5,000–10,000 years on the average to form or replace one foot of soil depth.
 - (d) The vertical profile—topsoil, undersoil, subsoil, bedrock.
 - (e) Humus and mineral plant foods.

2. Rainfall.

(a) Run-off.

Erosion related to slope, porosity, and cover.

(b) Soak-in.

Leaching.

(c) Soil moisture.

Nourishment of plant by osmosis of solutions.

3. Temperature, rainfall, evaporation, and growing season.

4. Soil utilization.

(a) Winning of land for farms.

(1) Clearing of forest.

(2) Breaking of grassland.

(3) Reclamation of wet, dry, and stony land.

(b) Percentages of major land uses in the United States.

IV. Problems of Land Use.

1. Problems in cultivating the soil.

(a) Desiccation (confined to semiarid lands).

(b) Exhaustion of fertility (primarily a problem of humid lands where the original stock of plant foods is low).

(c) Erosion (a problem of all except extremely level lands).

(1) Gullying. (See Fig. 1.)

(2) Sheet washing.

(3) Ablation. (See Fig. 14.)

2. Problems in determining land utilization.

(a) Which land is to be settled and which left unsettled.

(b) Choice of land use on the individual farm.

(c) Uses of the public domain.

V. Remedies.

1. For problems in cultivating the soil.

(a) Desiccation.

(1) For the moister parts of semiarid areas.

a. Dry-farming practices—dust mulching, fallowing.

b. Replacement of wheat and barley and other cereals with alfalfa, sudan grass, kaffir, and other forage crops to a large extent.

(2) For the drier parts of semiarid areas.

a. Reseeding in grass.

b. Changing from agricultural to pastoral use.

c. Keeping agriculture out of the region in the future.

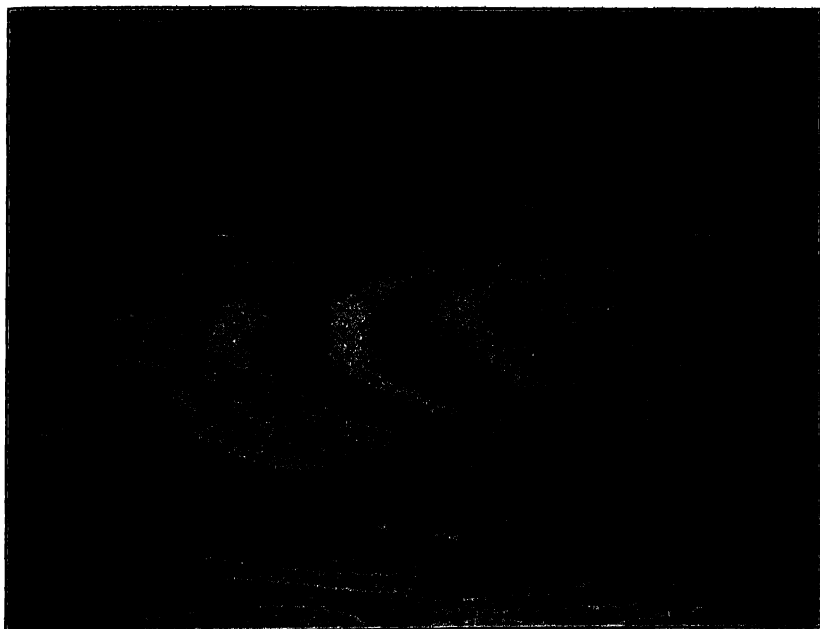
(b) *Exhaustion.*

- (1) Elimination of repeated plantings of a crop on the same land, i.e., rotation of crops.
- (2) Increased animal husbandry for the purpose of reducing cash sales of grain and forage, i.e., development of general farming wherever possible.
- (3) Application of animal manures and the plowing under of stubble, litter, and green crops.
- (4) Increased planting of legume crops for nitrate building in the soil. (The soybean is the most valuable crop known to man, both because of its soil-building properties and because of its promise for improved feeding of our population.)
- (5) Increased use of artificial fertilizer on lands justifying such expenditure.

(c) *Erosion.*

- (1) Classification of all land according to slope—flat or nearly level, gently sloping, rolling, steep.
- (2) Adjustment of land utilization to slope:
 - a. Flat or nearly level land—use for the clean inter-tilled crops (corn, cotton, tobacco, truck) and eliminate such crops from sloping lands unless safeguarded by special engineering practices.
 - b. Gently sloping land—devotion to grain crops (rice, wheat, oats, rye, barley, soybeans, cow-peas, etc.). Change the plowing of such land from rectangular to contour or level-curve plowing. Also use manguam terraces and back furrows at right angles to the slope.
 - c. Rolling land—devotion mainly to hay and pasture with back furrows through the pasture (some strip cropping of small grains and forage crops permitted in narrow bands parallel to the contour of the land, see Fig. 18).
 - d. Steep land—devotion to permanent grass under controlled grazing, if arid or semiarid; devotion either to forest or tree-crop agriculture if humid. Steep land can be cultivated for crops only if reconstructed into walled terraces. (In general this is too costly for American labor.)

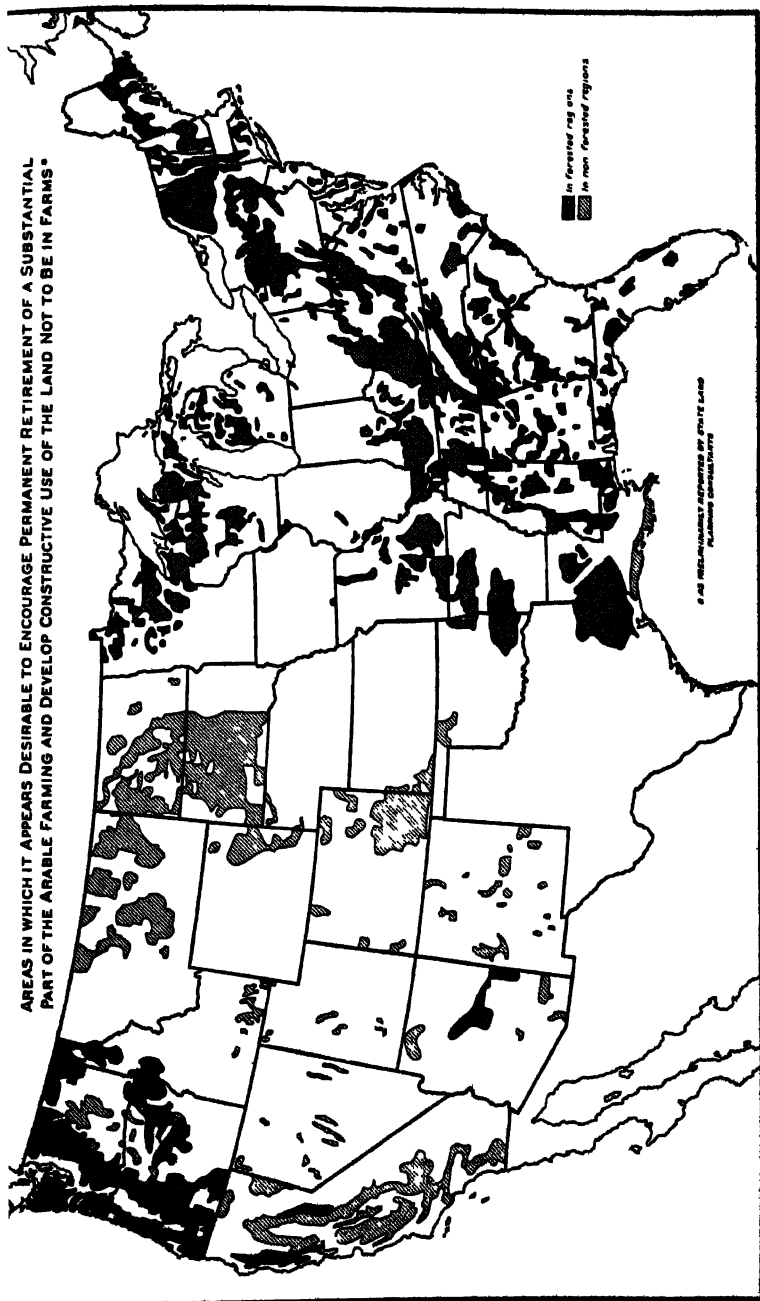
- (3) Maintenance of constant vigilance toward gullies.
 - a. Filling of existing deep gullies with rock, brush, or straw.
 - b. Plowing or disking down of shallow gullies and planting to grass, brush, or trees.
 - c. Leaving unplowed strips of grass in all low places and swales running through a field.



Photograph by Soil Conservation Service.

FIG. 18. Contour plowing and strip cropping on rolling land.

- d. Building of erosion check dams, according to approved engineering design, across vigorous, troublesome gullies.
- (4) Elimination of pasture overgrazing.
2. For problems in determining land utilization.
 - (a) Land planning. (See Fig. 19a.)
 - (1) Classification of all land as to best use.
 - (2) Determination of the total commodity needs of the nation:
 - a. Discouragement of the production of surplus crops.



Prepared in the office of the National Resources Planning Board.

FIG. 19b. Approximate areas of submarginal land in the United States.

- b. Encouragement of the production of deficit crops.
- (3) Removal of economically "submarginal" land from cultivation and even from all rural settlement. Devotion of such land to forest, range grass, wildlife refuge, reservoir sites, recreation, and other profitable uses. (See Fig. 19b.)
- (4) Resettlement of removed populations on reasonably productive land, or in areas where new occupations are developing.
- (b) Reclamation of good land as needed, through irrigation, drainage, stump and stone clearance, and so forth.

VI. The Teacher's Forum.

1. It is often said that the soil is our basic resource. Is this true? What is the basic resource in Labrador, Manhattan Island, Bermuda, the Ruhr Valley, the Oasis of Kufra, central Wyoming, the Olympic Peninsula? Why is the importance of a resource purely relative, rather than absolute? What relation does it bear to the "geographical division of labor"?

2. If man's careless treatment of his land results in local soil destruction, is that not merely the normal result of the operation of free competition? Why should the rest of us care? Are there not too many farmers anyway?

3. If we do restore the fertility of our soils, or at least their general usability, what shall we do with the surplus crops? Is subsistence farming desirable?

4. It has been said that the value of the soil eroded from cotton fields and washed into the sea since 1790 exceeds the value of the cotton exported to all foreign countries during that period. If that is true, then has cotton growing paid the South, or the nation? Do the cotton growers owe the nation for this waste of the nation's resources? Logically could they object to being made to practice soil conservation? Is the same true of all other resource use?

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CHAPTER XI

WATER—USES, PROBLEMS, AND REMEDIES

I. Aims of Study.

1. To examine the nature and importance of water resources and their relations to other categories of resources.
2. To note the many problems of water use and the interrelations of these uses.
3. To see the losses and disasters which have resulted from misuse of waters.
4. To examine the remedies proposed for the problems of water use.

II. Generalizations.

1. Water, like soil and air, is one of the really basic resources of mankind. Its public significance is far greater than the sum of its values to private individuals. A very large portion of the American people has a direct interest in the provision and maintenance of a pure and abundant public water supply.
2. Water has been more generally neglected, more shamefully abused, and has received less intelligent thought and constructive attention than any other resource. As Kenneth A. Reid points out: "It has been dammed and diverted, drained and polluted, stolen and wasted, with utter disregard for existing natural values and with bland unconcern for its biological functions and its public aquatic and recreational values."¹
3. Man has denuded large land areas of their forest and grass cover. Heavy rains and melting snows on such areas have carried away much of the soil. This not only has ruined land but also has created a whole series of secondary problems.
4. The increasing denudation of land and the choking of water courses with silt from eroded fields have augmented the flood

¹ K. A. Reid, *Quarterly Bulletin*, Vol. 2, No. 1, American Nature Association, Washington, D. C.

problem. For example, the Mississippi flood gauge at Memphis shows the following fifty-year record of the river's rise above average normal flow:

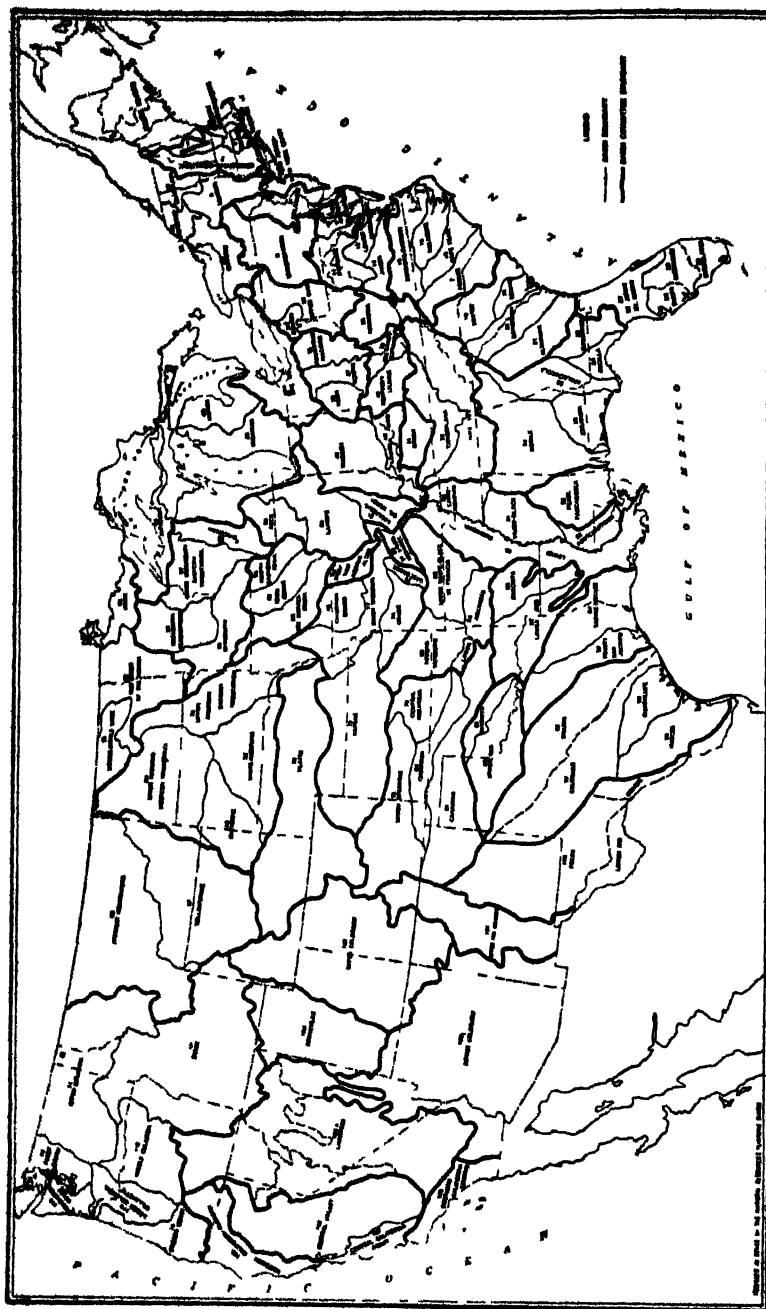
1890	35 feet
1916	43 feet
1927	46 feet
1937	50 feet

Such augmentation of floods means that an ever mounting toll of property and life is taken. A great flood is a genuine national disaster. Each decade floods cost the nation several billions of dollars in direct and indirect losses.

5. The most serious and widespread misuse of water is that occasioned by pollution. The annual loss from water pollution is probably somewhere around \$250,000,000—which represents an annual capital loss of not less than \$6,000,000,000. This far exceeds the amount which would be required to provide sewage-disposal plants for the entire nation.
6. The reckless depletion of ground water, both artesian and vadose, is increasing water shortage over large areas of the nation.
7. As population increases and industrialization becomes greater, the various possible uses for water are coming more and more fiercely into competition. Such competition has long been a chronic problem in the arid and semiarid parts of the West, but it has recently manifested itself in the humid East, as well.
8. The drainage basin of each major stream is a natural unit within which the various water uses and water-conservation problems are closely interrelated. (See Fig. 20.)
9. The conservation of water is inextricably tied up with that of soil, forest, wildlife, and recreational resources.

III. Water Resources.

1. The "Hydrographic Cycle" in nature.
Evaporation, circulation, condensation, precipitation, run-off, dry-up, soak-in, percolation, capillary action, utilization, transpiration, evaporation.
2. Distribution of precipitation over the United States. (See Fig. 21.)
 - (a) Humid areas.
 - (b) Subhumid areas.



Prepared in the office of the National Resources Planning Board.

FIG. 20. Drainage basins of the United States

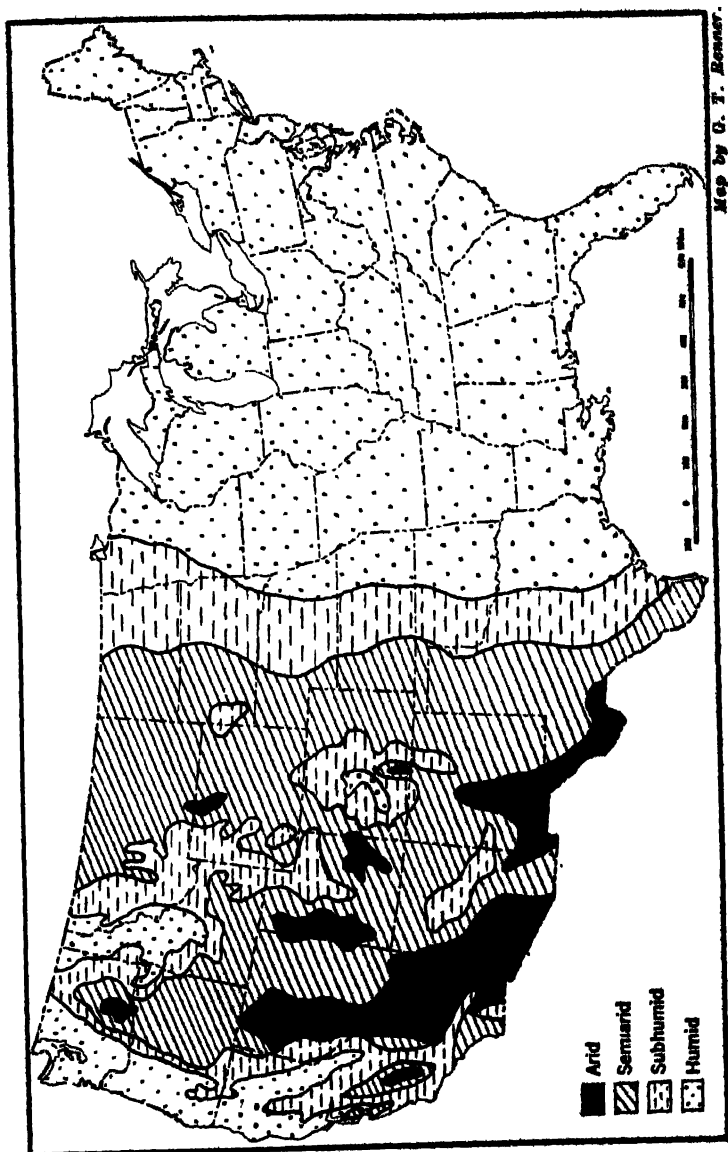


FIG. 21. Rainfall over the United States.

- (c) Semiarid areas.
- (d) Arid areas.
- 3. Droughts, their causes and effects.
- 4. Categories of water resources.
 - (a) Little waters.
 - (1) Brooks, runs, and rivulets.
 - (2) Sinks.
 - (3) Bogs, sloughs, and wetlands.
 - (4) Small springs and wet-weather seeps.
 - (5) Cascades.
 - (6) Tarns, moraine kettles, and playa lakes.
 - (7) Ponds and "tanques."
 - (8) Drainage and irrigation ditches.
 - (b) Intermediate waters.
 - (1) Creeks and non-navigable rivers.
 - (2) Vadose water and the water table.
 - (3) Lakes and bayous.
 - (4) Large flowing springs.
 - (5) Mineral and thermal waters; geysers
 - (6) Glaciers and perennial snow fields.
 - (7) Small waterfalls and rapids.
 - (8) Marshes and swamps.
 - (c) Great waters.
 - (1) Navigable rivers.
 - (2) Artesian basins.
 - (3) Navigable lakes.
 - (4) Ship canals.
 - (5) Lagoons, bays, estuaries, fjords.
 - (6) Harbors.
 - (7) Great falls.
 - (8) Storage reservoirs.
 - (d) Associated physical features.
 - (1) Overflow lands, flood plains, and playa basins.
 - (2) Gullies, draws, arroyas, gulches, and ravines.
 - (3) Rills and sheet washes.
 - (4) Sand creeks and wadies.
 - (5) Canyons.
 - (6) Bluffs, barrancas, and undercut banks.
 - (7) Bars, riverine islands, natural levees, and alluvial fans.

- (8) Stream divides.
- (9) Drainage basins and catchment areas.
- (10) Beaches, and so forth.
- (e) Associated biotic features.
 - (1) Watershed and floodplain forests.
 - (2) Marsh and swamp grasslands.
 - (3) Fishing and fish spawning grounds.
 - (4) Oyster and mussel beds.
 - (5) Waterfowl haunts.
 - (6) Aquatic animal habitats, and so forth.

IV. The Uses for Water.

- 1. Public and private water supply.
- 2. Industrial use.
 - (a) Raw material
 - (b) Plant machinery cooling.
 - (c) Waste disposal.
- 3. Stock watering.
- 4. Irrigation.
- 5. Navigation.
- 6. Drainage and flood control.
- 7. Generation of power.
- 8. Hydraulic mining.
- 9. Sewage disposal.
- 10. Aquatic animal and fowl propagation.
- 11. Oyster, fish, and mussel propagation.
- 12. Site use.
 - (a) Manufacturing
 - (b) Residence.
 - (c) Business.
- 13. Extraction of sand, gravel, and other products.
- 14. Recreation.
 - (a) Fishing and hunting.
 - (b) Boating, skating, camping, hiking.
 - (c) Bathing and so forth.

V. Problems of Water Use.

- 1. Competitive demands for water in any given region.
- 2. Elimination of water pollution.
- 3. Provision of additional supplies of water for the increasing needs of the future.
- 4. Flood control. (See Fig. 22.)

VI. Remedies.

1. Competitive water uses.

(a) The urgent need for reconciling conflicting uses.

- (1) Many uses are mutually destructive or prohibitive.
- (2) Some needs are concentrated in certain areas.
- (3) Certain needs are locally more urgent than others.
- (4) All conflicting uses reduce the usefulness of water resources to society.



Photograph by U. S. Army Corps of Engineers.

FIG. 22. One of the streets of Pittsburgh under water during the flood of January, 1937.

- (5) The question of who owns water resources.
 - (6) The question of who shall control or regulate them.
 - (7) The question of who shall do the reconciling between conflicting uses.
 - (8) All these considerations point to the need for public planning for water use.
- (b) A water-use plan.
- (1) Collect all available information and data on the sixteen major drainage basins of the United States.
 - (2) Find the areas where further study and data gathering are needed.
 - (3) Formulate the skeleton of a plan for each drainage basin.

- (4) Draw up a long-range ultimate pattern of use or uses for every water feature in the United States.
 - (5) Compile a list of private and public water-development projects (completed or proposed) which fit into that plan. Also compile a list of existing projects which conflict with the plan.
 - (6) Find the areas where the chief problems are located.
 - (7) Arrange a priority list of projects which will come later.
 - (8) Reconcile the water plan with other plans being made for land, forestry, wildlife, and so forth.
 - (9) Stimulate, in schools and public forums, a popular interest in, and a desire to carry out the plan and to thresh out the many problems of administration, finance, and control.
2. Pollution.
- (a) Garbage and waste-disposal plants.
 - (b) Filtration plants and settling basins.
 - (c) Silt reduction through soil-erosion control and flood control.
 - (d) Extension of sewer systems to unserved areas.
 - (e) Education of the public to cease personal and family habits of polluting public and private waters.
 - (f) New laws and regulations dealing with water uses.
3. Future inadequacy of water.
- (a) Use water for irrigation more efficiently.
 - (1) Reduce overirrigation of land.
 - (2) Substitute tile for open ditches.
 - (3) Line canals with cement to reduce leakage.
 - (b) Afforest and reforest land, restore grass cover, restore many drained sloughs and lakes, and construct ponds and reservoirs (see Fig. 23) in order to reduce run-off and increase soak-in, and thereby raise the water table.
 - (c) Cap all flowing wells, reduce the rate of pumping, and eliminate unnecessary wells, in order to replenish artesian basins.
 - (d) Build great storage reservoirs and construct aqueducts leading to points of deficiency.
 - (e) Construct navigation canals and canalize rivers, where needed.
 - (f) Substitute large water-power installations for many wasteful small plants.

4. Flood control.

- (a) Reforest watersheds.
- (b) Construct storage reservoirs.
- (c) Construct retarding basins.
- (d) Restore, where feasible, the lakes, swamps, sloughs, and wetlands which have been drained.
- (e) Cease the practice of straightening creeks and small rivers.
- (f) Carry out engineering works on river channels, floodways, and fuse-plug levees.
- (g) Control building and bridge construction within flood areas.
- (h) Reduce silt load through soil-erosion control.



Photograph by G. T. Renner.

FIG. 23. Even a small buffalo wallow filled with water is a valuable resource on the Great Plains. Many small artificial ponds need to be constructed throughout this semiarid region.

VII. Some Federal Water Projects.

- 1. Early irrigation projects in the West.
- 2. Boulder Dam.
- 3. The Tennessee Valley Authority.
- 4. The "New Deal" great public water projects.
 - Grand Coulee.
 - Bonneville.
 - The California Great Valley.
 - Passamaquoddy.
 - Florida Ship Canal.
- 5. The Federal Waterways Commission.
- 6. The Mississippi Flood Commission.
- 7. The Mississippi Valley Committee and the Water Planning Committee of the National Resources Planning Board.

VIII. The Teacher's Forum.

1. Why is the lower Mississippi sometimes called a "river on stilts"? Why cannot floods on this river be prevented by simply dredging out the channel? Why not build the levees higher and higher? Why not dig a new, perfectly straight channel?

2. Is it possible for the states where flood damage is worst to carry out, unaided, adequate flood prevention or control measures? Is this a clear example of where some federal agency must step in?

3. Suppose it is not economical to build a power plant at A because it would compete with a plant already established at B, and the power rates set by competition would not cover fixed costs. Suppose, however, that the government is interested in increasing its water-power capacity as a national defense measure? Is it fair for the government to build the new plant or to subsidize someone who will?

4. The economic philosophy of free enterprise and competition assumes that each business concern will bear the full cost of what it produces. Which, then, approaches more nearly the ideal of free competitive enterprise—leaving companies free to dump waste products into streams and other public bodies of water or compelling them to pay the costs of other modes of disposal? Is the following paradox true or false: "The spirit and intention of free competitive business enterprise is sometimes best served by regulation."

5. Does it make sense to say that "the government should keep hands off business except to preserve the law"? When we say this do we not mean only past law? Are the rules of any game made to preserve the spirit or the letter of the activity involved? Do the rules change from time to time as better ways are found for settling the limits of what can and cannot be done?

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² For publishers of these books, see reference list on pages 181-182 and item VIII, 6, on page 89.

CHAPTER XII

MINERALS—USES, PROBLEMS, AND PARTIAL REMEDIES

I. Aims of Study.

1. To appraise the nature and amount of our mineral resources.
2. To study the chief uses of minerals and the principal forms of waste in the mineral industries.
3. To examine possible methods of eliminating waste and prolonging the benefits of minerals to mankind.

II. Generalizations.

1. For the most part minerals are limited and exhaustible. Their slow rate of formation in nature indicates that when once used their replacement will be a matter of millions or even billions of years. It takes 350,000,000 years to make good coal. The annual consumption of petroleum in the United States is the equivalent of 1,000,000 years of formation.
2. Minerals are very unevenly distributed over the world, and even within the United States.
3. Civilization as we know it in the world today is primarily a mineral-using civilization. Of particular importance is the use of coal and iron.
4. The *large-scale* use of minerals is comparatively a new thing in human history. The first use of flint and obsidian by man began about a million years ago during the Eolithic Culture Period. The first systematic quarrying of flint and the occasional use of metals began in the Neolithic Period some 20,000-30,000 years ago. The Bronze Age in the western world began about 4000 B.C. and the Iron Age opened in Europe approximately 1200 B.C. Coal mining got under way in England shortly after A.D. 1700 and in the United States after 1820. The first oil wells were opened in Rumania and Pennsylvania in 1859. Metals had large-scale use in Europe and America after 1870. During the past century the world has used more minerals than during all the preceding millennia of time.

5. The present mechanical-power civilization in the United States is consuming a disproportionately large share of the world's mineral output. During the last few decades the United States has been consuming each year:

75% of the world's petroleum output
50% of the copper
47% of the iron
40% of the lead and zinc
37% of the coal

and large percentages of nearly every other mineral known to man. Our per capita mineral-consumption rate is two to three times as high as that in France or Germany and five to ten times as high as the Italian or Spanish rate. This exorbitant rate of consumption threatens to outrun completely our scientific ability to find new sources of materials now in use, to adapt unused materials to present uses, or to devise and adapt new materials.

6. In every mineral industry there is exorbitant waste—in some instances 50 to 150 per cent of the amounts eventually used. There is further exorbitant waste in the using and in the discarding of used materials.
7. The nation has a serious lack of some twenty industrial minerals—particularly tin, manganese, nickel, asbestos, platinum, and mercury.
8. The United States has long been recklessly exporting huge quantities of copper, petroleum, coal, phosphate, sulphur, zinc, and pig and scrap iron.
9. Our civilization cannot be regarded as a permanent one, even on a relatively short-term basis, unless drastic changes are wrought in our attitudes toward and our uses of the mineral realm. Our oil is more than half gone, copper production has passed its peak, high-grade Mesabi iron ore is good for another forty years or so, and our best coal will last only 100 to 200 years at most.
10. Mineral resources will probably never be completely exhausted. What is sure to happen, however, is the exhaustion of better grades, leaving the leaner, more inaccessible, and less economical portions to be mined at increasing cost in the future. It is not difficult to foresee a time when the Law of Diminishing Returns will prevent any further mining at a profit, and eventually will compel all mining to

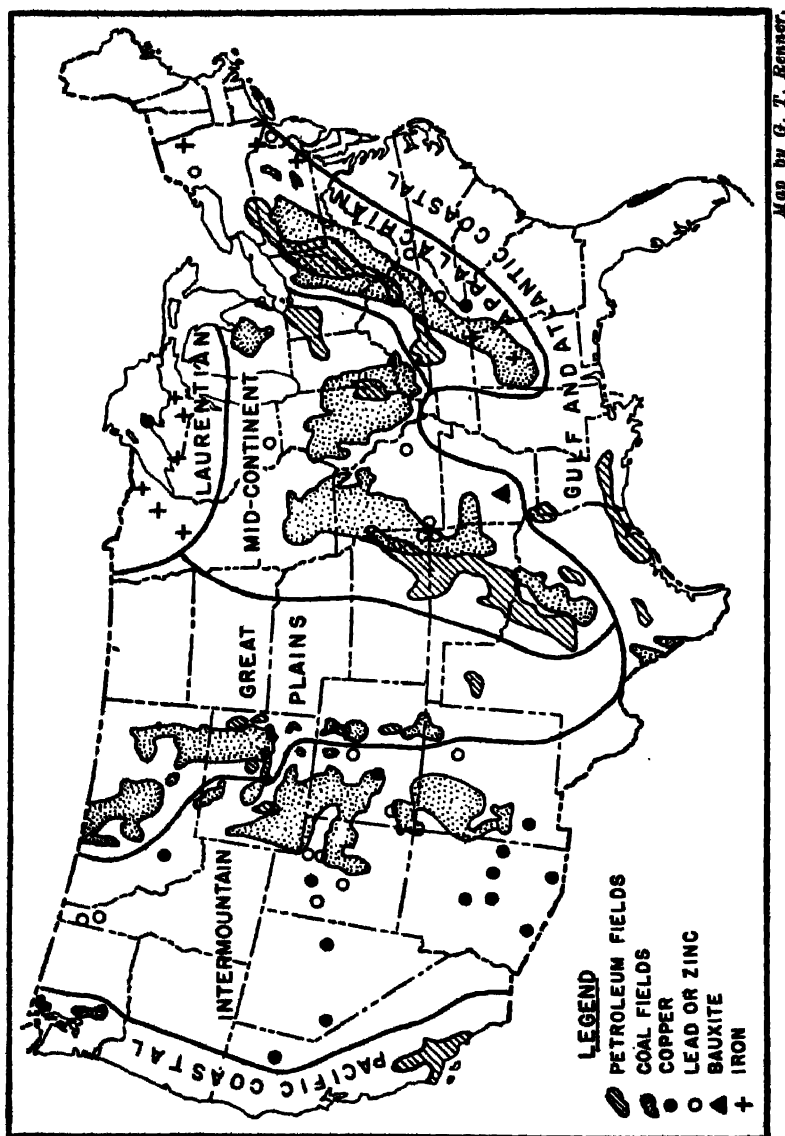
cease under any conditions whatsoever. The cream has already been used and anything comparable will never again be available in the future. Our present economic problem is a surplus of production, and this has concealed our real resource problem—which is that we are stripping the rich deposits in such a way as to leave vast amounts of lower-grade materials in unminable condition. This obscuring of the real problem has led people into overlooking and even rejecting conservation.

11. Our existing laws, our current economic policy of "laissez faire," and our present economic organization, all lead to wasteful mining methods, overproduction, periods of collapse, shutdowns with losses, irregular employment or complete unemployment, and much human misery. Competition forces all companies either to use these wasteful methods or to go out of business. International competition has further aggravated the situation.
12. Man has used minerals without thought of the future. Ethical considerations demand a policy which will show at least some concern for the needs of posterity. There is an imperative need for mineral planning and an increasing urge toward social and political control of the mineral resources.
13. The "Mineral Inquiry's" Mineral Conference of 1933 reported: "Detailed planning is not now possible. Nor is it possible to outline satisfactorily a comprehensive plan covering the whole situation."¹ If this is true, then common sense as well as ethics demands that we make it possible in the near future.

III. Mineral Resources.

1. The "Coal Series"; the formation of coal in nature.
2. The origin and geographical occurrence of petroleum and natural gas.
3. Petroleum and coal fields of the United States. (See Fig. 24.)
4. The world distribution of mineral resources.
5. The history of man's use of minerals.
6. The history of the coal industry.
7. Petroleum products; the history of the petroleum industry.

¹ Mineral Inquiry, *Elements of a National Mineral Policy*, American Institute of Mining and Metallurgical Engineers, New York, 1933, p. 18.



Map by G. T. Kensey.

FIG. 24. The mineral regions and some selected mineral resources of the United States.

8. The rise of the iron industry—past and present methods of making iron and steel; kinds of steel made today.
9. Classes of minerals.
 - (a) The fuels.
 - (1) Coal.
 - (2) Petroleum.
 - (3) Natural gas.
 - (b) The metallic minerals.
 - (1) Basic industrial metals.
Iron.
Copper.
Aluminum.
Lead and zinc.
Tin.
 - (2) The ferro-alloys.
Manganese.
Nickel.
Chromium.
Molybdenum.
Vanadium.
Tungsten, etc.
 - (3) Minor metals
Gold and silver.
Platinum, iridium, osmium.
Radium.
Mercury, etc.
 - (c) The non-metallic minerals.
 - (1) Mineral fertilizers.
Phosphate.
Potash.
Nitrate.
Lime and marl.
 - (2) Mineral chemicals.
Salt.
Soda.
Sulphur.
Borax.
Talc.
The salts of most metals.
Magnesia, etc.
 - (3) Gems.
Diamond, ruby, emerald, etc.

- (4) Abrasives.
Sandstone, garnet, etc.
- (5) Ceramic materials.
Clay, kaolin, bauxite, etc.
- (6) Building materials.
Sand, gypsum, lime, gravel.
Cement materials.
Stone.
Brick and tile clay, etc.
- (7) Other non-metallics.
Asbestos, mica, helium, fuller's earth, etc.

IV. Problems in Mineral Use.

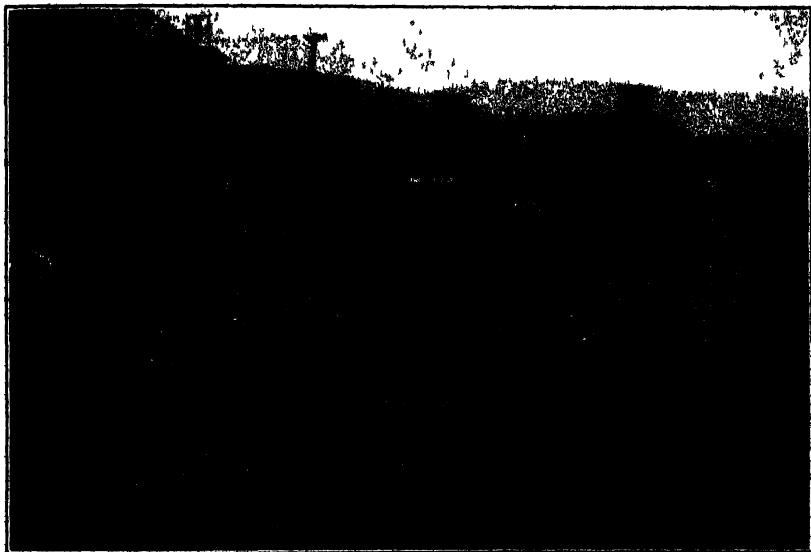
- 1. Increasing depletion of better grades of minerals, with rising prices.
- 2. Eventual exhaustion or near-exhaustion without concern for posterity.
- 3. National shortages of key minerals in a nationalistic and autarchic world.

V. Remedial Measures.

- 1. For the problem of the depletion of high-grade mineral supplies.
 - (a) Coal.
 - (1) Reduce waste in mining.
 - (2) Abolish taxes on unmined coal deposits.
 - (3) Convert more coal into liquid fuel, gas, and coke.
 - (4) Burn more coal near the mine and transmit the energy as electric power; develop superpower distribution systems.
 - (5) Develop more efficient coal-burning engines and heating plants.
 - (b) Petroleum.
 - (1) Reduce the number of wells. (See Fig. 13.)
 - (2) Abolish the "law of capture."
 - (3) Modify anti-trust laws so that industry can plan and regulate production.
 - (4) Abolish "wild-catting."
 - (5) Improve tax laws.
 - (6) Reduce the waste of oil in production; transportation, and use.
 - (7) Stop the waste of natural gas.
 - (8) Perhaps collectively regulate ownership rights.

(c) Metals.

- (1) Develop machine mining of low-grade ores.
- (2) Encourage the substitution of more abundant metals for those of limited supply.
- (3) Reduce competition in industry.
- (4) Reduce losses in smelting.



Courtesy of the Scranton Chamber of Commerce.

FIG. 25. Anthracite coal in Pennsylvania loaded and ready for market.

(d) General.

- (1) Separate mineral rights from land-ownership rights.
 - (2) Provide planned regulation—balancing of supply against demand.
2. For the problem of ultimate exhaustion.
- (a) Coal.
- (1) Change taxation: tax inversely according to depth rather than to tonnage produced. (See Fig. 25.)
 - (2) Change attitude toward mineral ownership. Perhaps nationalization of coal resources, with government leases to operators (as in Denmark and Sweden).
 - (3) Develop mining of low-grade coals, with use of lignite and peat.

- (4) Substitute inexhaustible or refundive sources of power for coal.

a. Develop water power to full extent; this will cost more than the use of coal and will require huge dams, long-distance power transmission, and some relocation of industry and population. (See Fig. 26.)



Courtesy of City Light, Seattle, Wash.

FIG. 26. Water power going to waste. Much of our potential water power remains unutilized while our exhaustible resources, coal and petroleum, are being used lavishly.

- b. Begin the development of other ultimate sources of power before the shortage of coal and petroleum becomes acute. Such ultimate sources are: wind power, tidal power, wave power, oceanic heat and pressure gradients, volcanic power, sun power, and atomic power.
- c. Develop vegetable sources of fuel: agricultural, such as potatoes; silvicultural, such as wood.
- (b) Petroleum.
- (1) Cease use of crude oil and refined products for all non-essential purposes.

- (2) Develop substitute products.
 - a. Make alcohol and other liquid fuels from vegetable sources, peat, and low-grade coal.
 - b. Make lubricating oils from vegetable and animal matter for low-speed use at first, and eventually perhaps for high-speed purposes.
- (3) Exploit oil shale. In Scotland and Esthonia, one to ninety gallons of gasoline are now being won from a ton of oil shale.

(c) The metals.

- (1) Use all possible care in production and utilization.
- (2) Plan for use on a long-time program.
- (3) Develop the use of substitutes.
 - a. Use non-metallic or earthy pigments in paints to replace lead, zinc, iron, and other metallic pigments.
 - b. Use lacquers instead of metal plating for steel containers.
 - c. Use glass, rubber, ceramics, and plastics to replace metal containers, forms, and surfacings.
 - d. Use plastics to replace metal wherever possible in automobiles, airplanes, boats, ships, plumbing, and certain types of machinery.
 - e. Use waxed paper, cellophane, and thin plastics in place of metal foils.
 - f. Replace food canning by dehydration and by packing in air-tight paper cartons.
- (4) Develop a national habit of saving all metal scrap, even to the smallest pieces, with adequate organization for collection and sale. Complete reclamation and reuse of all metals and alloys.

3. National shortages of key minerals.

- (a) Make a large-scale attempt to accumulate stocks of our deficit minerals from foreign sources, in return for those minerals which we export to foreign countries.
 - (1) Provide for direct government purchase of deficit minerals.
 - (2) Accept needed minerals as payment of tariff duties.
 - (3) Make reciprocity agreements for exchanges with foreign countries.
 - (4) Require that foreign debts be paid in part by contributions of those minerals which we lack.
- (b) Stop the unregulated export of our surplus minerals.

VI. The Teacher's Forum.

1. Everyone knows that our petroleum resources are severely limited. All of us know, too, their great value for fuel and lubrication. Why, then, did we permit the export of these materials to such countries as Germany, Italy, and Russia long after their aggressive intentions had been revealed? Exports of scrap iron, copper, and gasoline to Japan continued for years after an overwhelming sentiment in America had arisen against the rape of China. What would you suggest doing to our institutions to prevent the selfish interests of a few from outweighing the less immediate but far greater interests of many millions?

2. One of the arguments for business competition under a system of free enterprise is that it calls forth the production of the kinds of things which people want most and shuts off the production of things which they do not want. Another argument is that competition causes the failure of the less efficient and leaves production in the hands of the more efficient producers. What socially useful purpose is served by allowing private business, rather than the government, to own and operate mines and oil wells? What harm results? Is there any question about the advisability of public ownership of all *irreplaceable* resources of limited quantity? In 1910 Van Hise wrote: "But has anyone the right unnecessarily to destroy a natural product which took the building of the world to make, because we chance to have intrusted to him the charge of that product? There is no question of good morals in this matter. It is good morals to insist that such a product shall not be wasted; not only is it good morals, but it is good law."² Did Van Hise mean that it was good *legal theory* or *actual law*?

3. Under private ownership, even our scarce minerals are being used as fast as men can increase competitive demands for them. Such resources are, therefore, destined to last as short a time as possible. Under public ownership, the goal would be to reduce the demand for them and thereby to make them last a long time. By what means could we decide how many years they should be made to last?

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7. ELLIOTT, *Conservation of American Resources*, Unit IX.
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^a For publishers of these books, see reference list on pages 181-182.

CHAPTER XIII

FOREST—USES, PROBLEMS, AND REMEDIES

I. Aims of Study.

1. To gain an appreciation of the present and original extent of our forest resources.
2. To study the ways that forests and forest products are used and the ways they have been wasted.
3. To examine the relationship of forests to soil, water, wildlife, and recreational resources.
4. To determine the essential measures in forest conservation.

II. Our Forest Resources.

1. Present types of forest.

(a) True forest (hardwood, softwood, and mixed) (see Fig 27)	336,000,000 A
(b) Farm woodland (see Fig 28)	185,000,000 A
(c) Chaparral and scrub forest (see Fig. 29)	109,000,000 A
Total forest area	<hr/> 630,000,000 A

2. Uses of Forest.

- (a) Source of wood and wood products.
- (b) Grazing range.
- (c) Watershed protection.
- (d) Wildlife habitat.
- (e) Recreation.

3. Ownership.

(a) Private.

(1) Industrial holdings	248,000,000 A
(2) Farm woodland	185,000,000 A

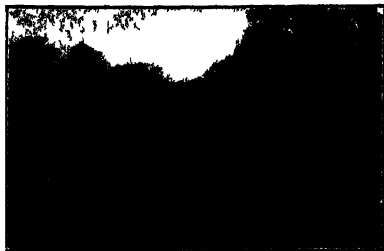
(b) Public.

(1) National forest	122,000,000 A
(2) Other federal forest land	48,000,000 A
(3) State forest	19,000,000 A
(4) County and municipal forest	8,000,000 A
Total forest land	<hr/> 630,000,000 A



Photograph by the U. S. Forest Service

FIG. 27. Virgin forest in the state of Oregon



Photograph by G. T. Renner

FIG. 28. Farm woodland in Minnesota.



Photograph by G. T. Renner.

FIG. 29. Scrub forest in the Southwest.

III. Generalizations.

1. America's original forest was magnificent in amount, quality, and variety. Forest growth of all kinds covered more than 915,000,000 acres. Today there are some 630,000,000 acres capable of carrying some kind of forest cover. Of this latter figure there are probably not more than 462,000,000 acres available for commercial forestry. This is not much more than half of the original 820,000,000 acres covered with commercial timber.
2. For generations, the American farmer "fought" the forest. He cleared and burned it, he deadened it and allowed it to rot, he permitted it to be swept by forest fires.

From the forest acres, came farmland and sites for villages and cities, wood for buildings, rail fences, firewood, navy and merchant ships, ties and trestles for railroads, and poles for telephone, telegraph, and power lines. More recently the forest has supplied wood pulp, paper, plastics, and artificial textiles.

3. The history of the lumber industry is a saga of waste.
 - (a) High stumps were left in felling trees.
 - (b) Clean cutting was practiced.
 - (c) Young trees were destroyed in logging.
 - (d) Less desirable species were thrown away.
 - (e) No seed trees were left.
 - (f) Slash was left as a fire hazard.
 - (g) Cut-over lands were grazed, destroying the grass undercover and the last remaining seedlings.
4. At the sawmill, wasteful methods of cutting and trimming were used. On the average, 60 per cent of the tree was wasted in the process of producing lumber and wood products.
5. Lumber has been wasted, used lavishly, and exported recklessly and improvidently.
6. The lumber industry developed slowly during the first two centuries after the settlement of America. Since then it has accelerated rapidly. It has been a "gypsy" industry, flitting rapidly across the continent. Prior to 1840, it centered in New England, Maine being the leading state in lumber production through most of that period. Since then, the leading producers have been:

1850	New York
1860	Pennsylvania
1870	Michigan
1880	Wisconsin
1890	Minnesota
1900	Mississippi
1910	Washington

Since 1910, the chief center of lumber production has remained in the Pacific Northwest, for the reason that there is no place to which the industry can migrate.

Fortunately, the forests of the Northwest were the richest on earth, but they cannot stand up under timber "mining" for very much longer. When they are gone, the industry cannot return to the East and start over again, for the East has not renewed its resources. (See Fig. 10.) Today, the saw-timber resources of the nation are distributed as follows:

- 50% in the Pacific Northwest
- 22% in the South
- 28% in all other parts of the country

7. After cutting the local forest and paying their current taxes, the lumber companies usually moved out. If it proved possible they sold the land to speculators or directly to settlers; if not, the land was abandoned.
8. In many localities the companies left behind them stranded logging and trading villages. Whole counties have become bankrupt, their major assets being tax-delinquent stump-land, decaying villages, and abandoned railways.
9. Land speculators and land-development companies have often used worthless stumpland as "sucker bait" for enticing settlers onto land wholly incapable of yielding a living. In some instances, the same land has been sold and partially paid for over and over, as often as a dozen times. Each time a new crop of farmers has been ruined.
10. In some forest regions, farmers on poor land have eked out a living by hunting, trapping, or cutting second-growth timber. As these auxiliary sources have dwindled, the farmers have sunk into such poverty that public relief has been necessary.

11. Often the total assessed value of poor farms scattered through the cut-over forest is less than the ten-year cost of providing them with schools, mail delivery, government, and road maintenance. Such a condition is intolerable.
12. Ninety-five per cent of all the forest land which has been utilized to date has been cut over without any thought of either natural restocking or artificial replanting.
13. The United States is now approaching a lumber famine. Many species have been commercially exhausted. Many inferior species have become standard market grades. The price of lumber has soared to almost prohibitive levels, and promises to rise higher in the future. This price increase has forced us to curtail sharply our use of lumber. The following table indicates the declining per capita consumption of lumber in the United States:

1906	525 board feet
1926	335 board feet
1931	130 board feet

14. Of the original 820,000,000 acres of commercial forest, only 101,000,000 acres of virgin or old-growth saw timber remained in 1940. To this should be added about 112,000,000 acres of second growth, making a total of 213,000,000 acres of commercial saw timber. This shrinkage from 820,000,000 to 213,000,000 acres has meant a decrease from an original equipment of 4,800,000,000,000 to 1,763,000,000,000 board feet.
15. Each year we cut many millions of acres of forest to meet our annual consumption of 30,000,000,000 or more board feet of lumber, 60,000,000 cords of firewood, and 8,000,000 cords of pulpwood. This is partially offset by an annual increment of second-growth timber, but much of this is considerably inferior to the original. At any event, we are now cutting timber $1\frac{1}{2}$ to 2 times as fast as nature is growing it.
16. Waste in logging and milling and failure to replant forest land are matched by our folly in failing to prevent forest fires. During the last decade or so, an average of 6 per cent of our total forest area has been burned over each year. Annually, too, there has been an average of 140,000 to 175,000 forest fires in the United States.
17. Ruinous and destructive methods have been used in the extraction of naval stores from our southern forests.

18. Accompanying the wastage of American forests, there has been a decline in forest wildlife resources, watershed protection, forest grazing value, and recreational quality. Often the very soil in which the forest must grow has been destroyed by fire and erosion.
19. Each year, some 850,000 acres of forest land are completely devastated. To date, we have devastated more than 85,000,000 acres by clean cutting, burning, and overgrazing. An additional 275,000,000 acres have been reduced to the point where its capacity to support forest growth is very low.
20. In addition to devastated and depleted forest land, there are some 50,000,000 acres of submarginal agricultural land which now need, or will need very soon, reforestation. Approximately 1,000,000 acres of agricultural land are being abandoned each year.

Some 25,000,000 acres of stumpland have reverted to the government for unpaid taxes, and many millions more are in various stages of delinquency. We have plenty of land unfit for anything else to supply all the timber we want—if we put it to work properly.

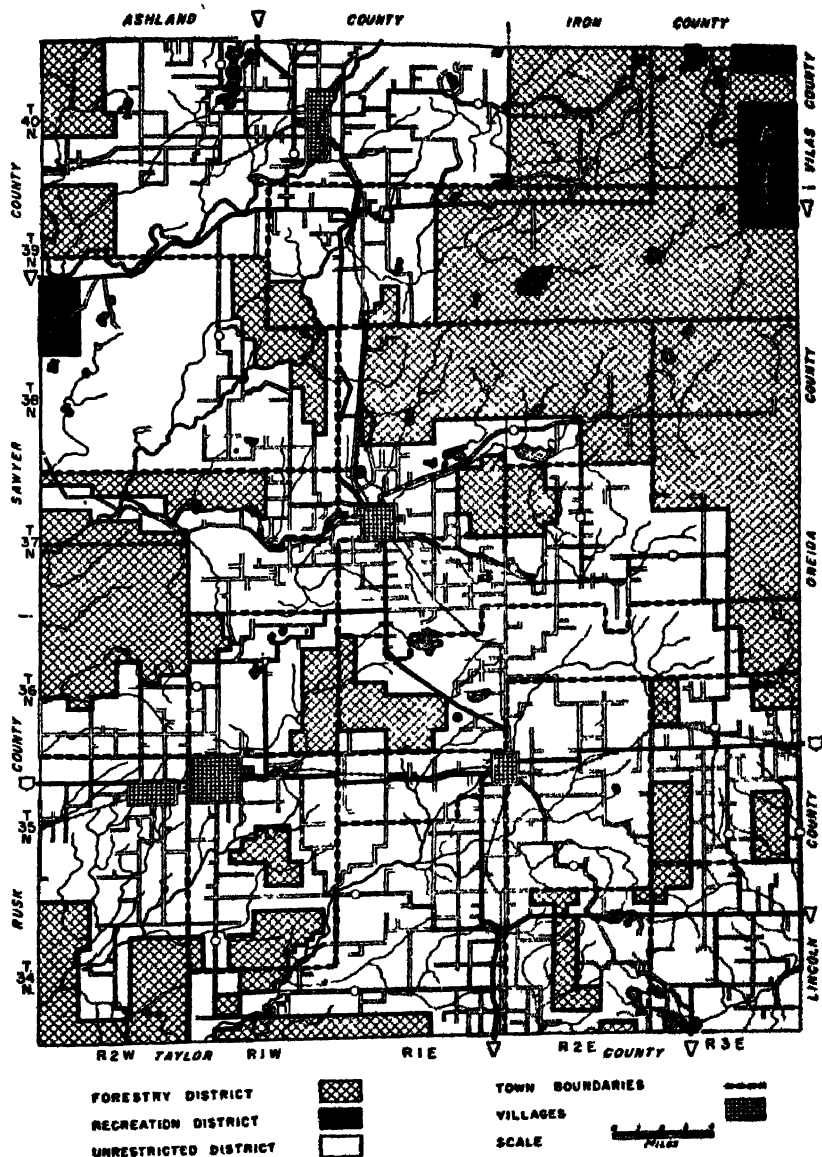
IV. Problems

1. Forest depletion and waste.
2. Lack of protection for watersheds.
3. Population on submarginal cut-over lands.

V. Remedies.

1. For forest depletion and waste.
 - (a) Protect forests from forest fires, insect pests, plant diseases, and overgrazing.
 - (b) Revise tax laws so as to encourage conservational logging by the lumber companies.
 - (1) No high stumping.
 - (2) Seed trees left.
 - (3) Disposal of slashings.
 - (4) No clean cutting.
 - (5) Reforestation of non-restocking areas.
 - (c) Pass uniform laws to eliminate advantages in some states which drive competing companies in other states to practice wasteful logging methods.
 - (d) Eliminate destructive methods characterizing much of the turpentine industry.

- (e) Plan regulation of the lumber industry to prevent over-production.
 - (f) Practice efficient milling, industrial utilization of wood waste, use of wood preservatives.
 - (g) Extend federal and state ownership to approximately 200,000,000 more acres and practice sustained yield on this area in order to insure constant renewal.
 - (h) Encourage towns to establish municipal forests.
 - (i) Educate the public to demand and support conservation logging on all public forest land.
 - (j) Substitute stone, brick, tile, and cement (but not metals) for wood in industry and the building trades wherever possible.
 - (k) Educate the public to use proper precautions against fire when hunting, fishing, camping, or traveling through forest land.
- 2 For lack of protection for watersheds.
- (a) Acquire publicly all important watershed areas, reforest them where denuded of tree cover or afforest them (where possible) if not originally timbered.
 - (b) Prevent fires, overgrazing, and other abuses of watersheds.
 - (c) Restrict or forbid logging on all crucial or erosive watersheds. Stock such areas with beaver to build many small ponds.
 - (d) Develop alternative uses of crucial watershed areas to replace logging.
3. For population on submarginal cut-over lands.
- (a) See that national and state forests are "blocked up" so as to eliminate isolated agricultural settlement.
 - (b) Encourage the counties to convert their low-grade tax-delinquent lands into county forest, to exchange them for state-owned agricultural lands within their boundaries.
 - (c) Employ land-classification programs to determine what areas are suitable for forest use and segregate them from other land uses. On the basis of this classification:
 - (1) Enact laws preventing land companies and individuals from selling cut-over forest land which is unfit for agriculture to settlers seeking farms.
 - (2) Enact county zoning laws separating agricultural from forestry districts. (See Fig. 30.)



PREPARED IN OFFICE OF THE NATIONAL RESOURCES PLANNING BOARD

Prepared in the office of the National Resources Planning Board

FIG. 30. Zoning map of Price County, Wisconsin.

- (3) Purchase submarginal farmland in the forest districts and resettle the population elsewhere.
- (4) Resettle this population on compound-use districts on the margin between public forest and agricultural land or between public forest and a mining or industrial area. Farm populations resettled in such borderline districts can work part of the year at forestry, recreation management, or wildlife management, and the remainder of their time on their small farms or in mine or mill. Returns from such combinations of part-time employments should make possible the adequate support of considerable numbers of people in areas not now profitable under single land uses.

VI. The Teacher's Forum.

1. The motto of the logging companies has been "cut off and get out." Such deforestation affects a community long after the logging company has left. Is it right to hold the logging company responsible for the stranded workers left behind? What hardships may destructive logging work on others in the neighborhood who were never employed by the company (erosion, water-table lowering, wildlife decline, decreased tax base, etc.)? Could regulations be devised which would see that the logging industry actually paid for its own costs?

2. Even if the local community got its full share of the logging profits (which it does not), would the lumber company be entitled to the remaining profits? What about communities a thousand miles away which suffer floods, impairment of water supplies, and so forth?

3. Does business competition have any bearing upon the practice of conservation by lumber companies?

4. Should every town and city in the United States own a municipal forest? Would such a plan pay?

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¹ For publishers of these books, see reference list on pages 181-182.

CHAPTER XIV

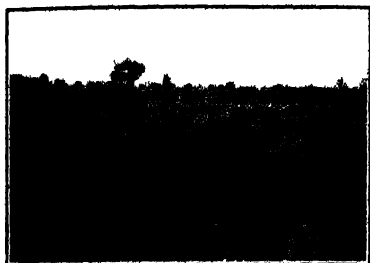
RANGE GRASSLAND—USES, PROBLEMS, AND REMEDIES

I. Aims of Study.

1. To understand what is meant by range and the types of land suitable for grazing use.
2. To learn how the range has dwindled in area and deteriorated in quality.
3. To examine proposed remedies for range conservation.

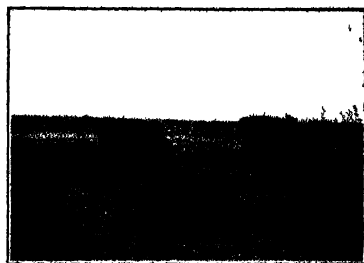
II. The Range as a Natural Resource.

1. In America the term range applies to all land the natural vegetation of which is suitable for the grazing of domestic animals. Such land includes tall grassland or prairie (Fig. 31), short grassland or steppe (Fig. 32), open forest and woodland with grass undercover (Fig. 33), mountain pasture or alpine tundra, the sub-Arctic tundras of Alaska, semi-desert bunchgrass (Fig. 34), and to a limited extent desert grass and shrub (Fig. 35).
2. The original public range in the United States covered more than 950,000,000 acres and extended almost unbroken from the Mississippi to the Pacific Coast Ranges, and from Canada to Mexico. Tall grasses on the Midwestern prairies covered about 320,000,000 acres, short grass on the Great Plains and some of the western plateaus covered about 300,000,000 acres, and open grassy forests covered about 130,000,000 acres. Semidesert bunchgrasses and desert grass and shrub of the West extended over perhaps another 200,000,000 acres.
3. The original area of range has shrunk considerably through the encroachment of other land uses. Most of the prairie has rightly been plowed and devoted to agriculture. Agricultural settlement has also encroached markedly upon the steppe. Indeed, dry farming has been carried far beyond advisable limits. Several millions of acres of semidesert and desert land has been irrigated and turned into farmland. Today, 46 per cent of the United States may be classified as



Photograph by G. T. Renner.

FIG. 31. Tall prairie grassland.



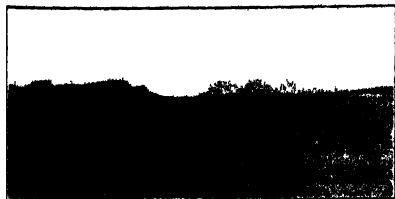
Photograph by G. T. Renner

FIG. 32 Short grass cover of the Great Plains.



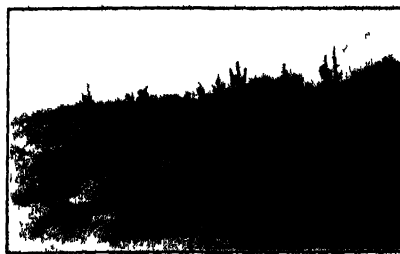
Photograph by G. T. Renner

FIG. 33. Woodland or open forest with grass undercover.



Photograph by G. T. Renner.

FIG. 34. Semidesert bunchgrass and shrub on the southwestern plateaus.



Photograph by G. T. Renner

FIG. 35. Desert shrub with little grass.

rangeland of one kind or another, 168,000,000 acres of this still remaining in the public domain.

4. Rangeland today probably includes a total of 728,000,000 acres, divided as to ownership approximately:

Federal	287,000,000
State and county	65,500,000
Private	375,500,000
Total	<u>728,000,000</u>

III. Generalizations.

1. The shrinkage of the range in area has caused an increasingly severe overgrazing of the remaining lands. This has so reduced the grass cover that erosion has reached alarming proportions.
2. Man's warfare on coyotes, snakes, owls, hawks, eagles, and so forth has caused the rodent population to increase greatly. They eat down the grass or break the sod with their burrowings, leading to further range depletion and erosion.
3. Destruction of small ponds and other watering places (see Fig. 23) and hunting of birds have caused insects to become more numerous, and they have taken a toll of the range.
4. Plowing of lands for dry farming and overgrazing of grasslands have caused wind erosion, with resulting destructive dust storms. They have also destroyed the watershed value of the grasslands, with the consequent choking of river channels with silt and sand and the increase of floods. Irrigation ditches have likewise been choked with silt.
5. Overgrazing, erosion, and loss of topsoil have brought an invasion of weeds and inferior grasses, with further decline in the grazing value of the range.
6. Since 1900, some 75 per cent of the range has been steadily declining in carrying capacity, about 10 per cent has held its own, and approximately 15 per cent has been improving in quality. Some 37 per cent of all range is severely depleted and an additional 16 per cent almost completely devastated. All told, 50 to 60 per cent of the original value of our present rangelands has been lost.
7. More than 500,000,000 acres of rangeland are now eroding seriously, promising a serious decline in the livestock industry.

Many ranchers are having to decrease their herds. This means lowered income with eventual ruin for many. Thou-

sands of small ranches have already become "submarginal" with owners on public relief, and with lands abandoned or tax delinquent.

Wildlife has been seriously depleted and the recreational values of the western rangelands (camping, hunting, and fishing) seriously reduced.

8. The range, like the forest, is a renewable resource. It should be speedily restored and properly managed under a permanent sustaining program. If this is not done, much of the range is destined to become permanent desert.

IV. Problems in Range Use.

1. Depletion of cover and destruction by erosion.
2. Encroachment of other land uses.

V. Remedies.

1. For depletion and destruction.

- (a) Stop overgrazing. For the time being, the amount of livestock carried by public and private ranges should be reduced by 35 to 40 per cent. Grazing of certain areas should be changed from an annual to a seasonal basis.

- (b) Restore grass cover.

- (1) Reseeding of badly damaged areas.

- (2) A period of rest or non-use for badly depleted areas.

- (3) Weed eradication.

- (4) Rodent control.

- (c) Institute a program of range management.

- (1) Federal and state management and regulated leasing for government lands.

- (2) A program of education, demonstration, and financial credits for private rangelands.

- (d) Prevent grass fires.

- (e) Control erosion.

- (1) Permanent discontinuance of grazing on land subject to serious erosion.

- (2) Back-furrow terracing on thinly grassed slopes.

- (3) Tree planting along water courses, on broken lands, shelterbelt plantings on the uplands where possible.

- (f) Impound waters in gullies, in creeks, in buffalo wallows, and near springs.

- (g) Construct ponds and "tanques" where feasible.

- (h) Provide cover and water for increased bird life.

- (i) Encourage changes in land division and in the settlement pattern in arid and semiarid regions.
- 2. For encroachment of other land uses.
 - (a) "Blocking-up" of the federal or state range holdings.
 - (b) Acquisition of much additional range by the government; acquisition through purchase, exchange, and tax delinquency. Considerable agricultural settlement on submarginal farmland should be resettled and the land reseeded.
 - (c) Scattered through the range in small parcels are considerable amounts of valley land which could be profitably cultivated. Cultivation of such land should be prevented. Land of this kind has a high grazing capacity and, if it is removed from the use of the stockman, an additional grazing burden will be thrown upon the lands of lower carrying capacity.
 - (d) Prevention of the extension of agriculture into semiarid lands during cycles of heavier rainfall.
 - (e) Increased forage production on the irrigated and dry-farmed lands adjacent to the range.

VI. Additional Topics for Consideration.

- 1. The "Great American Desert" as a public concept in American history.
- 2. Changes in land-settlement laws as applied to western United States.
- 3. Cycles of drought and settlement on the Great Plains.
- 4. Dust storms of the 1930's on the Great Plains and the Columbia Plateau.
- 5. J. W. Powell's *Report on the Lands of the Arid Region of the United States*, Government Printing Office, 1879.
- 6. Conflict between sheepmen, cattlemen, and nesters on the range during the latter half of the nineteenth century.
- 7. Provisions and possibilities of the Taylor Grazing Act.

VII. The Teacher's Forum.

- 1. Should the Federal Government own all range grassland and lease it under conservational restrictions to private ranchers?
- 2. With proper state enabling laws provided, can we hope for restoration and proper range management through local co-operative action?
- 3. Does range depletion exert a major effect upon our national economy?
- 4. Should agriculture be removed entirely from the western Great Plains? This would involve grassland restoration over the western one-third of the

Dakotas, Nebraska, Kansas, Oklahoma, and Texas, and over the eastern portions of Montana, Wyoming, Colorado, and New Mexico. This would necessitate the abolition of the present county governments in this area. It might mean the substitution of a large county unit without township government as in the forest lands of northern Maine, or it might mean an unorganized unit under state supervision. Would such changes mean ultimate economic improvement or depreciation to these states?

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¹ For publishers of these books, see reference list on pages 181-182 and item VIII, 6, on page 89.

CHAPTER XV

WILDLIFE—USES, PROBLEMS, AND REMEDIES

I. Aims of Study.

1. To study the general nature of wildlife resources and their usefulness to man.
2. To note changes in animal and plant life caused by man.
3. To consider the measures necessary for restoring and preventing future depletion of wildlife.

II. Categories and Uses.

1. Categories.

(a) Commercial fisheries.

- (1) Deep-sea and bank fisheries.
- (2) Inshore fisheries.
- (3) Fresh-water fisheries.
- (4) Crustacea and shellfish.

(b) Wild plants.

(c) Other wildlife.

- (1) Migratory waterfowl and shore birds—such as ducks, geese, swans, and cranes. (See Fig. 36.)
- (2) Song and ornamental birds—such as robins, cardinals, and whippoorwills.
- (3) Upland game, including rabbits, quail, grouse, prairie fowl, and pheasants.
- (4) Insectivores—reptiles, amphibia, bats, rodents, and woodpeckers and other species of birds.
- (5) Big game and fur-bearing animals.
- (6) Game and semigame fish.
- (7) "Vermin" and predators, such as wolves, badgers, and skunks.

2. Uses.

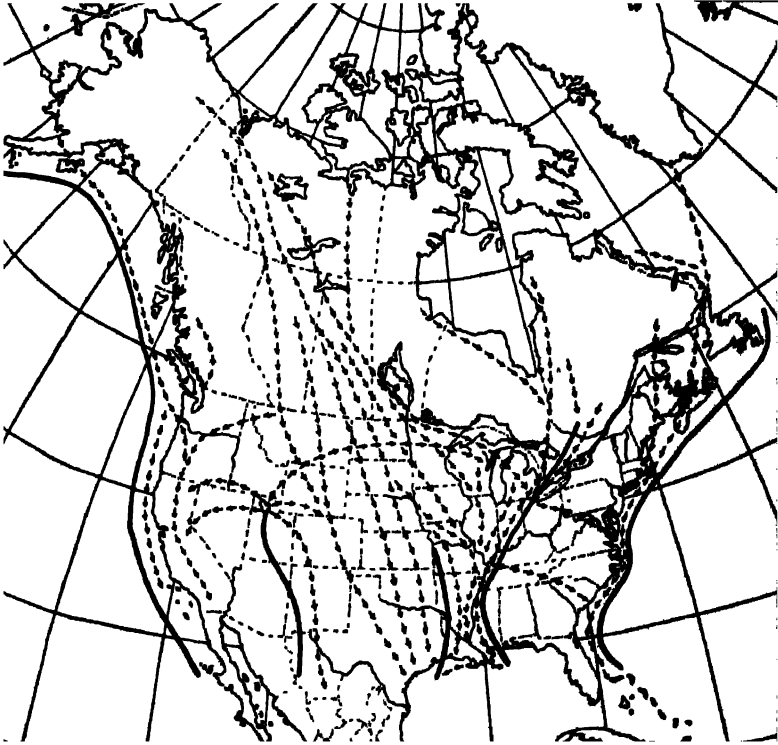
(a) Commercial fishing.

(b) Commercial trapping.

(c) Market hunting (no longer permitted for most animals).

(d) Gathering of wild flowers, shrubs, barks, and nuts for sale.

- (e) Pot hunting, skillet fishing, and pin-money trapping.
- (f) Fishing and hunting for sport.
- (g) Other recreational uses of plants and animals.
- (h) Esthetic and psychological values of fauna and flora.
- (i) Economic value of insect and rodent eaters, through the protection of vegetation, crops, buildings, and public health.



Courtesy of the U S Bureau of Biological Survey.

FIG. 36. Major waterfowl flyways.

III. Problems.

1. Extermination and depletion by man through immoderate attack.
2. Destruction of habitat and impairment of environing conditions which provide food, shelter, and safety.
3. Upsetting the ecological balance in the plant and animal world.

IV. Generalizations.

1. North America was originally a wonderland of wild game and other forms of animal and plant wealth. These were used sparingly by the native Amerindians as a source of many of the necessities of life.
2. The American people fell upon this fauna and flora with every device they possessed or could invent. After more than three centuries of ruthless attack, only a small remnant remains. The bison, elk, and passenger pigeon are extinct. The beaver, parakeet, sturgeon, trillium, and wild orchid are almost gone. Many other species of wildlife are now threatened with extinction.
3. The clearing of forest, breaking of grassland sod, burning of brush, draining of swamps, straightening of creeks, and lowering of the water table have greatly restricted the habitat for wildlife and caused reduction in plant and animal numbers.
4. Water pollution, forest and grass fires, leakage of oil, the erosion of soil, and the consequent silting of streams, have destroyed much wildlife.
5. Man has made unwise warfare upon hawks, eagles, owls, snakes, toads, tortoises, and other eaters of insects and rodents. Robert Ripley once pointed out that if all "the progeny of two flies lived and bred there would be enough flies by the end of the summer to fill 2,388,000,000 wheat cars—making a train 20,000,000 miles long. There would be more than 5,600,000,000,000,000 flies weighing 116,900,000,000 tons."¹

A pair of field mice usually produce six litters per year, each litter averaging five young mice. If all the offspring of this pair of mice survived and lived through one breeding season, these two mice would have 1,257,165,562,500 descendants at the end of ten years.

To offset these stern biological realities, owls, hawks, snakes, and other predators make constant warfare upon the rodents, and most songbirds will daily eat more than their own weight in insects. A University of Kentucky bulletin reports the finding of more than 200 caterpillars in a crow's stomach, more than 300 mosquito larvae in a kill-

¹ Quoted in C. N. Elliott's *Conservation of American Resources*, Turner E. Smith and Company, Atlanta, 1940, p. 519.

deer's stomach, and a collection of 340 grasshoppers, 55 bugs and beetles, 2 wasps, and a spider in a hawk's stomach. And yet we kill and mistreat these allies of ours, or else keep house cats which do the killing for us. House cats are reputed to kill between 15,000,000 and 20,000,000 birds each year in the two states of Iowa and Missouri alone.

6. For nearly 300 years, market hunting depleted or exterminated many forms of wild game. A considerable amount of market hunting is still carried on in bootleg fashion.
7. Excessive hunting, fishing, and trapping, killing during the mating season, night hunting, seining and dynamiting of fish have greatly depleted wildlife resources.
8. Introduction of foreign species from Europe, Asia, and Tropical America, and the unwise killing of predators and so-called vermin have upset the balance of nature. This has depleted some forms of wildlife and caused the rapid increase of other undesired species.
9. Farms, villages, cities, industrial districts, and highways have encroached upon the habitat of wild animals and plants and have caused their disappearance or depletion.
10. The food and fur yield of wildlife has greatly declined; the number of hunters and fishermen has increased by leaps and bounds. The fishing and hunting opportunities are shrinking rapidly. Revenue from the sale of licenses and income to those engaged in certain forms of the recreation business is threatened. Public and private expenditures for insect control are increasing. Rodent and termite damage is mounting year by year. Wildlife conservation is imperative.

V. Remedies.

1. For extermination and depletion.
 - (a) Pass better game laws and enforce them more strictly.
 - (b) Set up especial restrictions on migratory birds and fish.
 - (c) Protect depleted species by closed seasons.
 - (d) Eliminate all stray cats.
 - (e) Stock streams, woodland, and grassland. (See Fig. 37.)
 - (f) Establish more wildlife sanctuaries and refuges wherein wildlife will not be molested. Provide adequate breeding grounds and hatcheries. (See Fig. 38.)
 - (g) Inaugurate and encourage game management on farms and other private lands.

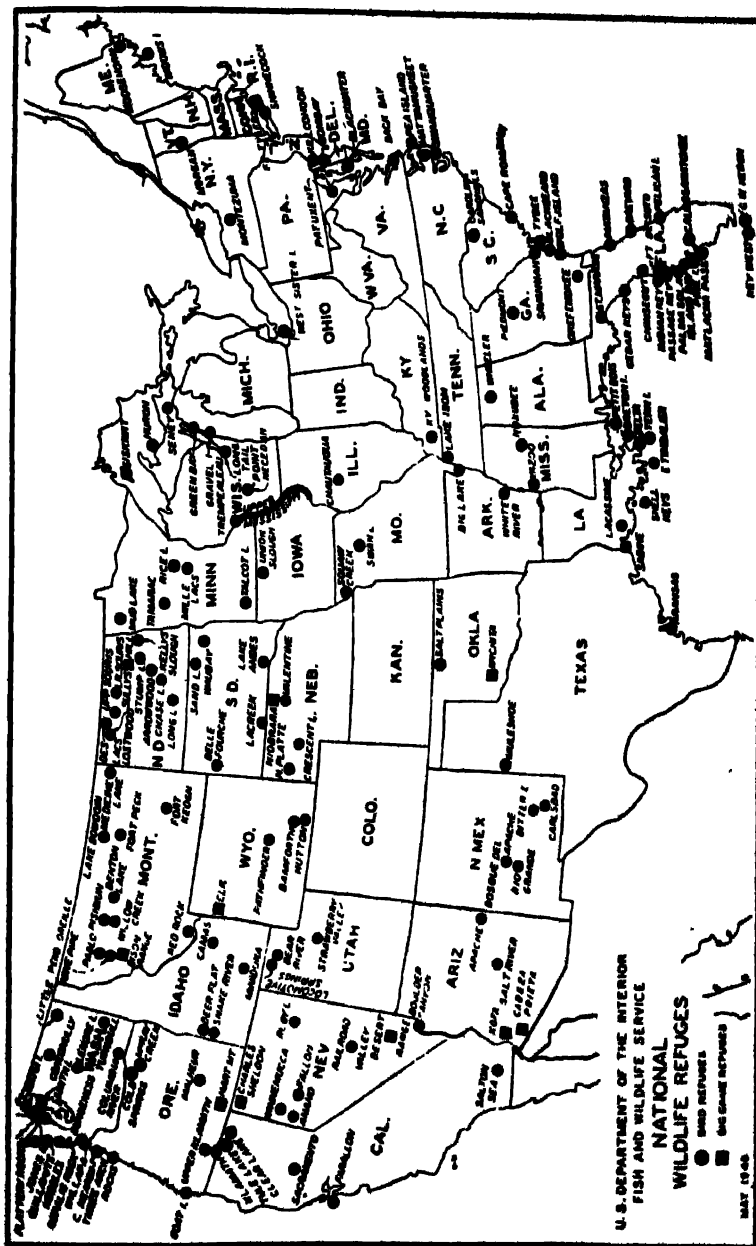
- (h) Establish, develop, and regulate public hunting ranges and forests.
- (i) Educate the public.
 - (1) In nature appreciation and biology.
 - (2) In an active interest in wildlife.
 - (3) In better habits toward wild plants and animals.
 - (4) In the support of wildlife conservation.
- (j) Encourage winter feeding in backyards, in parks, and on farms.



Courtesy of U S Bureau of Fisheries

FIG 37. Planting fish in a small lake.

- 2. For destruction of habitat.
 - (a) Provide cover and protection on farms.
 - (b) Eliminate water pollution.
 - (c) Restore all drained land which has proved to be of low value for agriculture.
 - (d) Erect bird houses and shelters.
 - (e) Eliminate grass and brush fires on idle land.
 - (f) Fire protection for forest land.
 - (g) Establish permanent wilderness and primitive areas for the preservation of virgin plant and animal life.
 - (h) Establish check areas where wildlife habits can be studied.
 - (i) Construct ponds and small lakes in arid areas. (See Fig. 23.)
 - (j) Oppose all proposed public works which threaten to destroy wildlife habitat, unless real public benefit can be demonstrated.
- 3. For the upsetting of the ecological balance.
 - (a) Institute weed control where advisable.



Courtesy of the Fish and Wildlife Service.

refuges in the United States.

N:

- (b) Cease unwise killing of predators.
- (c) Eliminate bounties on vermin and the common use of poisoned baits.
- (d) Increase forest and range management.
- (e) Encourage and support the scientific study of the inter-relations of living orders and species.

VI. Psychological Obstacles to Wildlife Conservation.

1. The idea of clean cutting in the logging industry.
2. The idea that wild flowers have to be picked in order to be enjoyed.
3. The "pot hunting" habit and the traditional American idea that all edible wild game is legitimate prey for man.
4. The idea that the well-kept farm should have rectangular fields and clean fence rows.
5. The idea that all wetlands should be drained.
6. The love for cats, particularly the toleration of half-wild ones. (Even the well-fed house cat will kill many times its own value in birds. The cat is not a completely domesticated animal as is the dog, although that fact is not generally appreciated.)

VII. The Teacher's Forum.

1 Do sports-men's organizations and rod-and-gun clubs have a positive value in conservation?

2. Why is it possible to achieve conservation in connection with wildlife more quickly than in relation to other resources?

3. Although we may feel that it is lamentable for wildlife to be depleted, are those of us who are not directly interested in using or enjoying it really much concerned in wildlife preservation? If all the birds in America were exterminated, what effect would it have on human life?

4. Edward Bok, when editor of the *Ladies' Home Journal*, tried to save the egret from extermination by persuading women not to buy egret feathers. In a series of articles he showed that the desired plumes were obtainable only during the nesting season, and every egret killed left a nest of baby egrets to starve. What would you expect the result of Bok's campaign to have been? Actually the consumption of egret feathers was greatly increased by the publicity. Does this suggest that any education for conservation must begin by challenging our whole standard of value? Were the women of America fundamentally cruel because they demanded more egret feathers? Or were they merely indoctrinated with silly ideas of what was admirable in human behavior? For example, how many economic goods are purchased simply because they make the buyer conspicuous?

VIII. The Teacher's Bibliography.

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GABRIELSON, I., *Wildlife Conservation*. Macmillan, New York, 1941.

RACHFORD, C. E., *et al.*, *Planning for Wildlife in the United States*, Supplementary Report of the Land Planning Committee to the National Resources Board, Part IX, Government Printing Office, Washington, D. C., 1935.

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U. S. Fish and Wildlife Service, *Officers and Organizations Concerned with Wildlife Protection*, Circular 10,, Government Printing Office, Washington, D. C., December, 1940.

IX. Textbook References.²

1. PARKINS and WHITAKER, *Our Natural Resources and Their Conservation*, Chapters XIX and XX.

2. GUSTAFSON, *et al.*, *Conservation in the United States*, Chapters X, XI, and XII.

3. BRINSEER and SHEPARD, *Our Use of the Land*, Chapter VI.

4. FLYNN and PERKINS, *Conservation of the Nation's Resources*, Chapter 5.

5. RENNER and HARTLEY, *Conservation and Citizenship*, Unit VI.

6. GLOVER, *America Begins Again*, Chapter VI.

7. ELLIOTT, *Conservation of American Resources*, Units II, III, IV, and X.

8. HEADDON and HEADDON, *Conservation of Wildlife and Forests in Tennessee*.

² For publishers of these books, see reference list on pages 181-182 and item VIII, 8, on page 121.

CHAPTER XVI

RECREATIONAL RESOURCES—KINDS, PROBLEMS, AND TREATMENT

I. Aims of Study.

1. To examine the nature of man's recreational needs.
2. To understand the resources for recreation which America
3. To learn how these resources are being neglected, defaced, and in some cases irretrievably lost.
4. To study the methods for restoring and utilizing these resources.

II. Recreational Resources Classified.

1. Resource categories.

(a) Physical.

- (1) Water features—lakes, rivers, springs, marshes, etc., for swimming, boating, fishing, skating.
- (2) Beach, riparian frontage, small bars and islands for summer residence, camping, bathing, picnicking.
- (3) Soil for gardening.
- (4) Land space for playgrounds, play fields, glider runways, etc.
- (5) Topographic features—mountains, valleys, hills, dunes, ridges, escarpments, etc., for climbing, hiking, skiing, coasting, etc.
- (6) Climatic conditions—summer, winter, year-round outdoor life. (See Fig. 39.)

(b) Biotic.

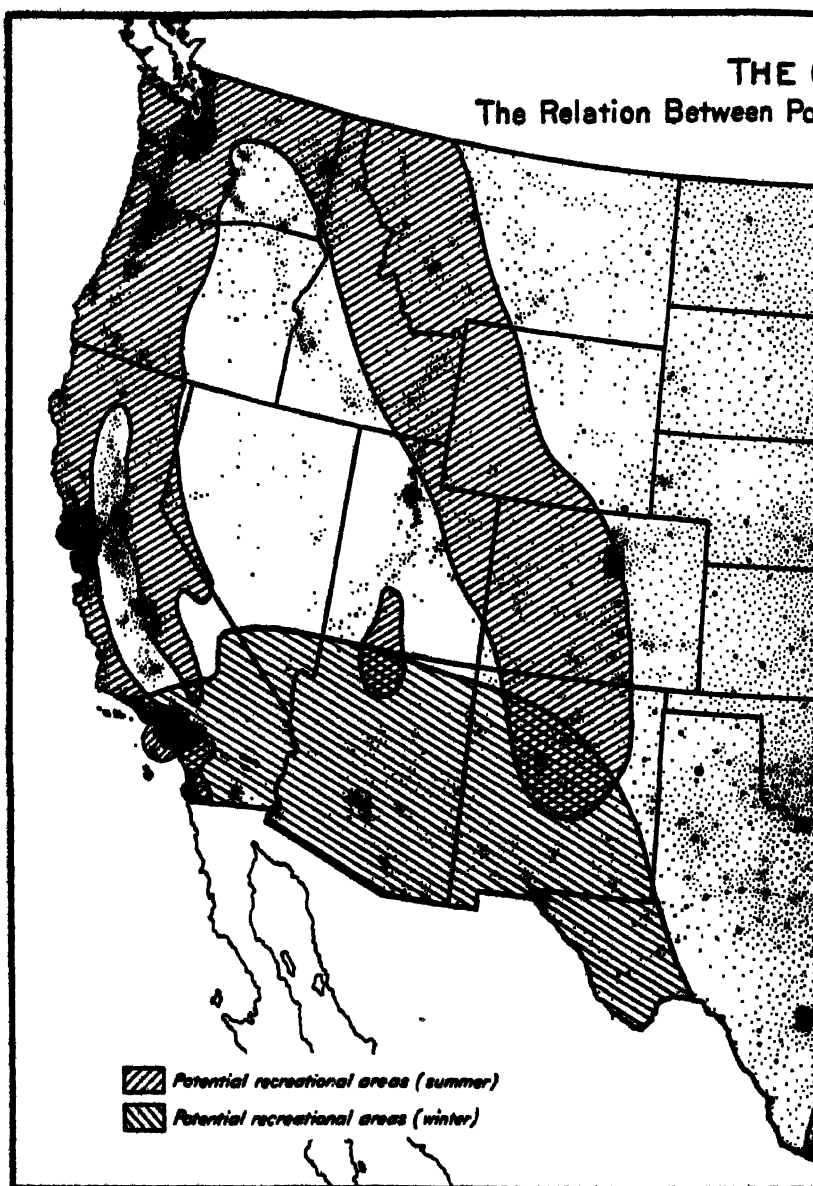
- (1) Fish for fishing.
- (2) Forest—for camping and hiking.
- (3) Wild animals—for hunting, field observation, and camera "hunting."
- (4) Wild flowers and shrubs—picking, "botanizing," field study.

(c) Esthetic.

- (1) Wild flowers—beauty and interest.

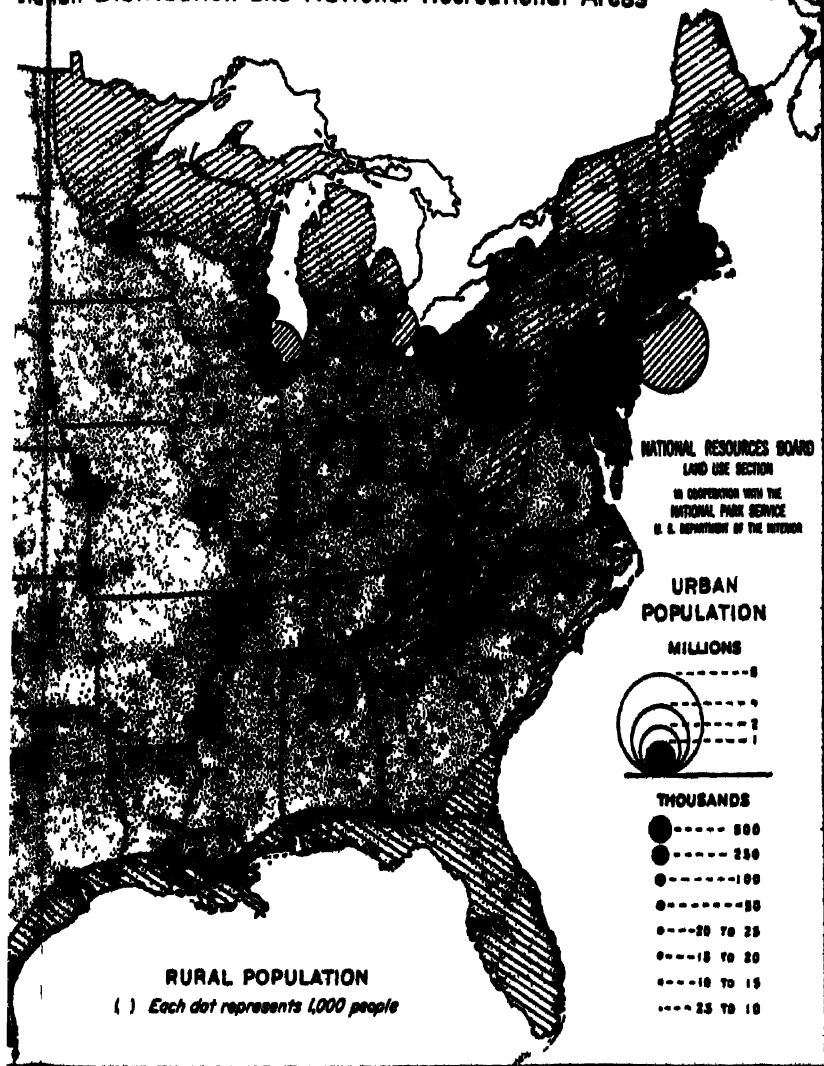
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GEOGRAPHY OF RECREATION

Population Distribution and National Recreational Areas



- (2) Bird and animal life—songs, calls, interesting behavior, beauty.
- (3) Waterfalls and geysers—beauty and sound.
- (4) Vantage points—sites providing exceptional scenic views.
- (5) General scenery—landscape, seascape, and skyscape.
- (6) Roadside scenery—pleasure riding, touring, picnicking.
- (d) Scientific sites.
 - (1) Caverns, caves, and sinks.
 - (2) Volcanic features.
 - (3) Dune areas.
 - (4) Unusual rock outcrops.
 - (5) Unusual examples of faulting, erosion, stream capture, etc.
 - (6) Fossil beds and petrified forests.
 - (7) Areas of virgin forest, grassland, desert, marsh, wild-flower growth, with associated bird and animal life.
 - (8) Unusual trees and other plants.
- (e) Historic sites.
 - (1) Battlefields.
 - (2) Monuments.
 - (3) Indian reservations.
 - (4) Early Indian mounds, village sites, burial grounds.
 - (5) Historic homes, mills, churches, cemeteries, public buildings, forts, log cabins.
 - (6) Trails and migration routes, early canals, bridges, fords, etc.
 - (7) Prehistoric remains and ruins.
- 2. Facilities for recreation.
 - (a) Urban.
 - (1) Playfields, playgrounds, tot-lots.
 - (2) Wading pools, swimming pools, beaches.
 - (3) Walks, bridle paths, bicycle lanes.
 - (4) Village and city garden plots.
 - (5) Zoos, aquaria, parks, squares, waterfronts.
 - (6) Gymnasias, club rooms, and community centers.
 - (7) Vacant lots.
 - (b) Rural.
 - (1) County, state, and national parks.
 - (2) Town, county, state, and national forests.

- (3) National monuments.
- (4) Wildlife preserves.
- (5) Wilderness areas and sanctuaries.
- (6) Public hunting and fishing grounds.
- (7) Hiking trails and hostels.
- (c) Privately owned facilities.
 - (1) Summer homes, cottages, country estates, private or group camp grounds.



Courtesy of the Rancho Rancho, Wickenburg, Ariz.

FIG. 40 A Dude Ranch in the southwestern desert. Left to right, main ranch house, patio, and two auxiliary cottages. Dry stream bed in the middle background.

- (2) Spas, resorts, and hotels.
- (3) Dude ranches. (See Fig. 40.)
- (4) Boarding farms.
- (5) Private game preserves and "posted" land.
- (6) Commercialized scenic, historic, and scientific sites.
- (7) Beaches, water frontage, and scenic sites, privately held through the misconception and abuse of private ownership rights.
- (d) Wayside facilities. (See Fig. 41.)
 - (1) Tourist homes, cabin camps, tourist cabins, and wayside hotels.
 - (2) Roadside picnic grounds.

- (3) Roadside camp grounds.
- (4) Scenic drives and parkways.
- (5) Roadside viewpoints and turnouts.

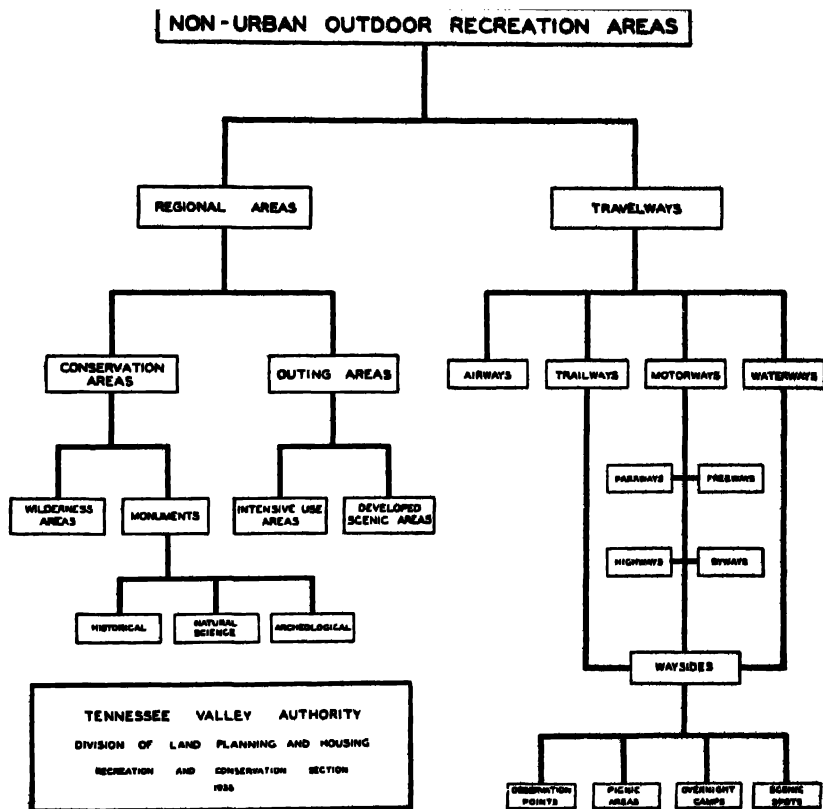


FIG. 41. Types of areas dealt with in making a recreation plan.

III. Generalizations.

1. Recent human history has been marked by man's increasing escape from overwork and constant drudgery. Modern science, invention, and improved organization of business have decreased the hours of labor for the worker, postponed the age of going to work for children, extended the life span of old people, and increased the number of people who do little or no work.
2. This increase in the amount of leisure is beneficial to man if he can utilize it in desirable ways. It is imperative that

people be educated to use their leisure worthily and that recreational resources be preserved, increased and made available to them.

3. The recreational "industries"—tourism, resort management, keeping of seasonal boarders, park management, and so forth have within the last few decades assumed gigantic proportions. Collectively, they form an industry comparable to the steel industry and the automotive industry. The recreation industry promises further growth in the future. Indeed, there are many who prophesy that it will become the greatest of all the nation's industries.
4. In view of this existing and potential importance of recreation, it is only sound business that the nation's scenery and play resources be carefully conserved. The state of Wisconsin estimates that visitors who come to that state to enjoy the scenery and play resources have been spending more than \$200,000,000 annually during the last few years. Similar expenditures over the nation probably amount to six billion dollars or more.

Recreational development also brings permanent improvements and hence represents added capital equipment. Many townships in the Great Lakes Region, for example, report that recreation facilities yield from 50 to 85 per cent of the total property tax returns.

5. Recreational needs are proportional to the density of population in any area. (See Fig. 39.) Judged in this light, the densely populated East, among all the nation's regions, has the poorest provision for its needs. All the larger cities of the United States are also hopelessly underprivileged in this respect. The modern development of rapid transportation means that no longer is urban congestion necessary or even morally justifiable. We must open up our cities into a new design, with tremendous amounts of parks, playgrounds, commons, and garden areas available to all.
6. To date, the American people have paid far too little attention to the nation's scenic and esthetic resources. We have accordingly developed a set of destructive habits which remarkably parallel those of early Neolithic man on his indescribable kitchen middens. Some of these are:
 - (a) Using creeks and rivers for open sewers.
 - (b) Leaving scattered litter where we have camped or picnicked. (See Fig. 42.)

- (c) Allowing forest, grassland, brushland, and swampland to burn over time after time.
- (d) Dumping cans, bedsprings, and other rubbish in water bodies, on vacant land, and along highways.
- (e) Allowing municipal dumps, automobile graveyards, and collections of shacks to accumulate on the outskirts of cities.



"Let's just leave these cans and things around—it gives this place a touch of civilization."

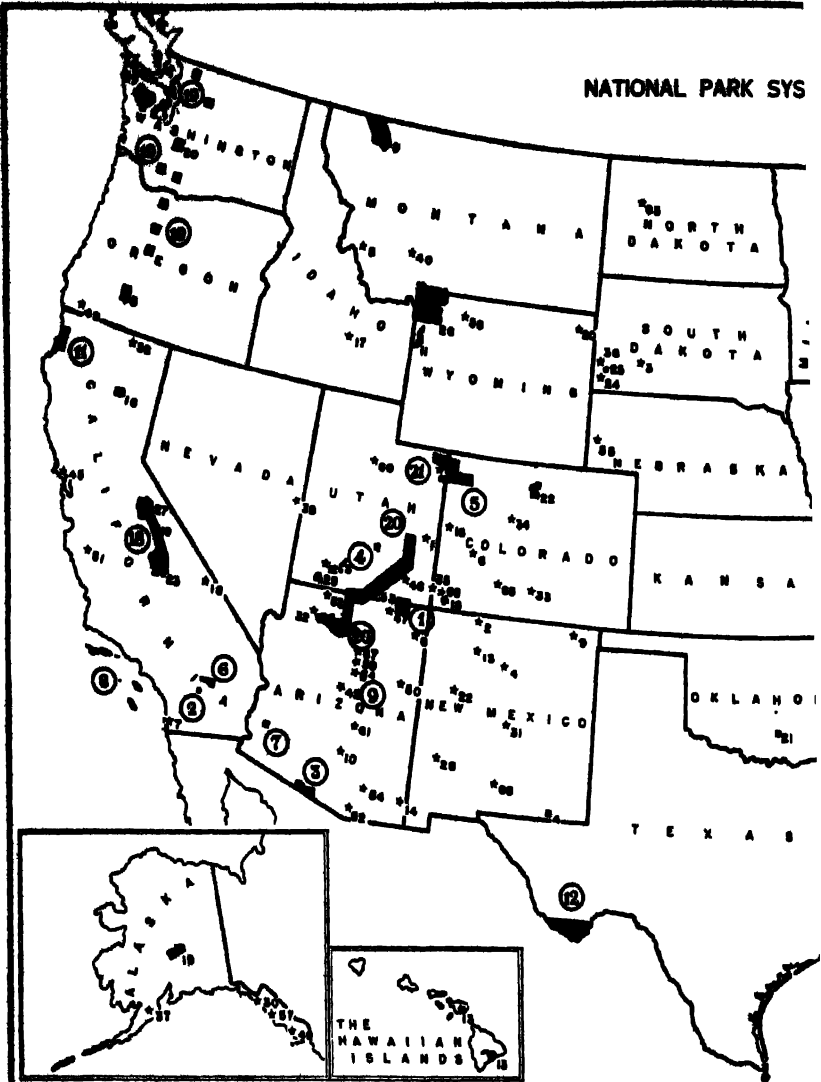
Courtesy of McNaught Syndicate, Inc.

FIG. 42. A Pittsburgh *Post-Gazette* cartoon satirizing an all too common treatment of natural recreational resources.

- (f) Permitting the complete despoliation of roadside beauty in many areas.
7. The defacement of beauty has proceeded so far in many instances that it can never be undone, or else will be remedied only at extreme cost:
- (a) Cities and towns have been so designed as to create monotony, ugliness, and an aggravated need for recreational escape.
 - (b) The landscape has been eroded, denuded, and cluttered with signs and ill-planned buildings. (See Fig. 4.) Many beauty spots have been destroyed in order to use them for industrial and other "practical" purposes.

- (c) Bridges, railways, and factories can be things of beauty if designed and located correctly, but seldom have we recognized that fact.
 - (d) Many species of birds, fish, and wild animals have been exterminated and cannot be restored.
 - (e) Many species of flowers and shrubs have been exterminated or rendered almost extinct by overpicking and other practices.
 - (f) Highways have been encroached upon by signs, roadside stands, and buildings. This not only renders highways hideous but also permits no widening for increased future traffic needs. Such mistakes often can never be rectified.
 - (g) Beaches, waterfronts, and other recreational sites have in many instances been pre-empted and built upon by selfish private and commercial interests.
 - (h) Scenic views have often been obscured by private residences.
 - (i) Landscape beauty has in many cases been destroyed by smoke, smelter fumes, mine tailings, and quarry workings.
8. In most states, navigable waters are public property. Their banks and shores, however, are subject to private ownership. Society must hasten to assure itself of public rights to such sites as still remain open.
 9. Many people are coming to believe that sites of great natural beauty or scientific interest should not be privately owned. Accordingly the federal, state, and county governments have been acquiring and setting aside large numbers of parks and monuments for public use.
 10. As the nation comes of age, its historic sites have assumed greater educational significance and have aroused greater interest. The public acquisition of such resources has showed a considerable increase.
 11. Existing recreational land and unused sites in every large American city are inadequate for present and future use. Adequate facilities can be provided only at exorbitant cost and over a considerable time.
 12. Recreational resources for the nation at large are, however, entirely ample. The task facing America is to save, rehabilitate, restore, utilize and make these resources available

NATIONAL PARK SYS



INDEX

EXISTING AREAS

NATIONAL PARKS

1. Adirondack Park
2. Acadia
3. Bryce Canyon
4. Carlsbad Caverns
5. Capitol Reef
6. Grand Canyon
7. Grand Teton
8. Glacier
9. Grand Staircase
10. Great Basin
11. Great Smoky Mountains
12. Haleakala
13. Hot Springs
14. Isle Royale
15. Lassen Volcanic
16. Mammoth Cave
17. Mount Rushmore
18. Mount St. Helens
19. Mount Whitney
20. Mount Rainier
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36. Mount St. Helens

UNCLERED PARKS

1. Chaco Canyon
2. Fort Sumner
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MONUMENTS

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36. Antelope

REPRESENTATIVE PARKS

1. Grand Canyon

UNITED STATES AND SOME PROPOSED ADDITIONS

**NATIONAL RESOURCES BOARD
LAND USE SECTION
IN COOPERATION WITH THE
NATIONAL PARK SERVICE**

LEGEND

- ▲ NATIONAL PARK
- NATIONAL HISTORICAL PARK
- ▲ NATIONAL MILITARY PARK
- ★ NATIONAL MONUMENT
- BATTLEFIELD SITE
- ◆ NATIONAL CEMETERY
- ◆ MISCELLANEOUS MEMORIALS
- PROPOSED AREAS

- 1 *Quebec* is the *French* largest *Province*, *located* in the *eastern* part of *Canada*, and *differs* *politically* from the *other* *Provinces* in *constitution* *law*.
- 2 *John* *Roberts*, *former* *Chief* *Justice*, *declared* *that* *the* *Quebec* *Charter* *is* *in* *violation* *of* *the* *Canadian* *Charter*.
- 3 *The* *area* *of* *certain* *parts* *of* *Quebec*, *is* *located* *in* *the* *United* *States*, *in* *the* *public* *domain*.
- 4 *Quebec* *Windsor*, *that* *is* *the* *public* *domain*.
- 5 *Quebec* *Province*, *located* *in* *the* *public* *domain*, *is* *located* *in* *the* *public* *domain*.
- 6 *The* *area* *of* *certain* *parts* *of* *Quebec* *is* *located* *in* *the* *United* *States*, *in* *the* *public* *domain*.
- 7 *The* *area* *of* *certain* *parts* *of* *the* *Quebec* *Province*, *is* *located* *in* *the* *public* *domain*.
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LEGEND

- NATIONAL PARK
- ♥ NATIONAL HISTORICAL PARK
- ▲ NATIONAL MILITARY PARK
- ✦ NATIONAL MONUMENT
- BATTLEFIELD SITE
- ✦ NATIONAL CEMETERY
- MISCELLANEOUS MEMORIALS
- PROPOSED AREAS

1. Antigen	1. Comp Street Signs
2. Background	2. MS Word 98
3. Chlorophyll	3. Lee Harvey
4. Fast Forward	4. How Many Words

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- 48 Old Forest
- 49 Sugar Creek
- 50 Painted Forest
- 51 Flamingo
- 52 Pine Spring
- 53 Rainbow Ridge
- 54 Sugar
- 55 Snake Hill
- 56 Strawberry Canyon
- 57 Villa
- 58 Statue of Liberty
- 59 Sunset Castle
- 60 Strawberry Cove

61. Tuna
62. Tunacons
63. Tunacons
64. Walnut Canyon
65. Winesap
66. White Birds
67. Wapiti
68. Tappan House
- 2071.1313
1. Substantive
2. Appositional
3. Oblique Case

- 4 Cholesterol
- 5 Calcium
- 6 Fort Necessity
- 7 Tenacious Henshaw
- 8 Monocacy
- 9 Tugalo
- 10 Whole Foods

6. Friedrichsburg
6. Göttingen
7. Pappe's Green
8. Stahl
9. Simon's Map
10. Hildesheim
11. Vordamm

- ## NOTES

1. Sediments
2. Aquifers
3. River-Crossing Rock

to the public. This is a program in which every citizen, child, or adult can play a part.

13. To preserve natural beauty, to create additional beauty, convenience, and enjoyment, and to pass such assets on to future generations are among the noblest of all acts.
14. The moral and esthetic effects upon those who practice conservation of this sort far exceed the practical or monetary results, admittedly large though these are.
15. We have made a good beginning toward certain phases of the conservation of recreational resources. In 1940 there were 25 national parks aggregating in areas over 8,500,000 acres. (See Fig. 43.) In addition to these, there were 68 national monuments, totaling nearly an equal number of acres. Approximately 3,000,000 acres of land were, in that same year, held as state parks. Denver, Chicago, and a few other cities possess large areas of rural parkland outside their limits. In 1940, there were 157 national forests with an aggregate area of more than 170,000,000 acres. Some of these are now, and nearly all of them will eventually be, available for recreational use. Unfortunately 21,000,000 acres are in Alaska, 135,000,000 acres are in the sparsely populated West, while only 14,000,000 acres are in the more densely populated lands east of the Mississippi.

The states own approximately 10,500,000 acres of non-park forest lands, while counties and townships own approximately 5,000,000 acres. Most of this will eventually be available for recreation in some form or other. Nevertheless, as a nation we have merely begun to develop our recreational resources.

IV. Problems.

1. Misuse, deterioration, and depletion of recreational resources.
2. Inadequacy of publicly owned resources.
3. Encroachment of private interests upon public interests.

V. Remedies.

1. Misuse, deterioration, and depletion of recreational resources.
 - (a) Repossession of suburban frontage along major highways; clearance of roadside slums and billboards; highway zoning control for 1,000 feet on either side of rural highways.
 - (b) Rerouting of certain highways to make esthetic lands accessible.

- (c) Organized programs of landscape beautification and roadside improvement.
 - (d) Public repossession of large amounts of urban and suburban water frontage.
 - (e) Pollution control for all waters.
 - (f) Restoration of wildlife through hatcheries, preserves, sanctuaries, and adequate legal protection.
 - (g) Cultivation of new public habits with regard to despoiling wild flowers, shrubs, and bird nests; setting of fires, rubbish disposal, landscape defacements.
2. Inadequacy of publicly owned resources.
- (a) City and metropolitan planning for the inevitable increase of recreation needs in the future—with full citizen support.
 - (b) Changed attitudes toward the ownership, uses, and valuation of urban land.
 - (c) Public acquisition of large areas for city parks, golf courses, gardens, and other urban recreational land; extension of the town forest and greenbelt idea.
 - (d) Acquisition of more national and state parks. The creation and development of six very large national beach parks, five on the ocean (Maine Coast, the Del-Mar-Va Coast, Gulf Coast, Southern California Coast, Oregon Coast) and one on the southeastern shore of Lake Michigan. (See Fig. 43.)
 - (e) More extensive development of the multiple use of public forest land.
 - (f) Construction of a system of national parkways to connect our national parks, with recreation and controlled tourist accommodations along each parkway.
3. Encroachment of private interests upon public interests.
- (a) Education of the public concerning the value of our government parks and forests and the need for protecting them against the private interests which clamor constantly for permission to exploit them.
 - (b) Education of the public to see the social loss resulting from the possession of fine recreational sites by private individuals and companies.
 - (c) Application of the Right of Eminent Domain to important public recreational projects.
 - (d) The zoning of certain kinds of land for recreation use. (See Fig. 30.)

- (e) An accelerated acquisition of public title to potential recreation land before it is put to other socially less desirable uses.

VI. The Teacher's Forum.

1. How long ago was it when any worker was required to work "from dawn till dark"? When did the ten-hour work day become more or less standard? When did the eight-hour work day win general acceptance? When did the thirty-eight-hour week begin to be accepted? What is the social implication of increasing leisure? The educational implication? What are the arguments for and against leisure for the masses?

2. Will the working day be shorter in the future than now? Why? In view of the increasing amount of leisure and an increasing use of auto and plane, what faults are apparent in the fundamental design of our cities? Of our rural communities? What two ways out are possible? Which are we likely to choose, generally speaking? What action does this imply on our part?

3. What basic differences are there among national parks, state parks, and municipal parks? What is a national monument? What kinds of encroachments are constantly threatened against parks? What is the reason? Why do we need a system of national parkways or tourways?

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CHAPTER XVII

HUMAN RESOURCES—NATURE, PROBLEMS, AND REMEDIES

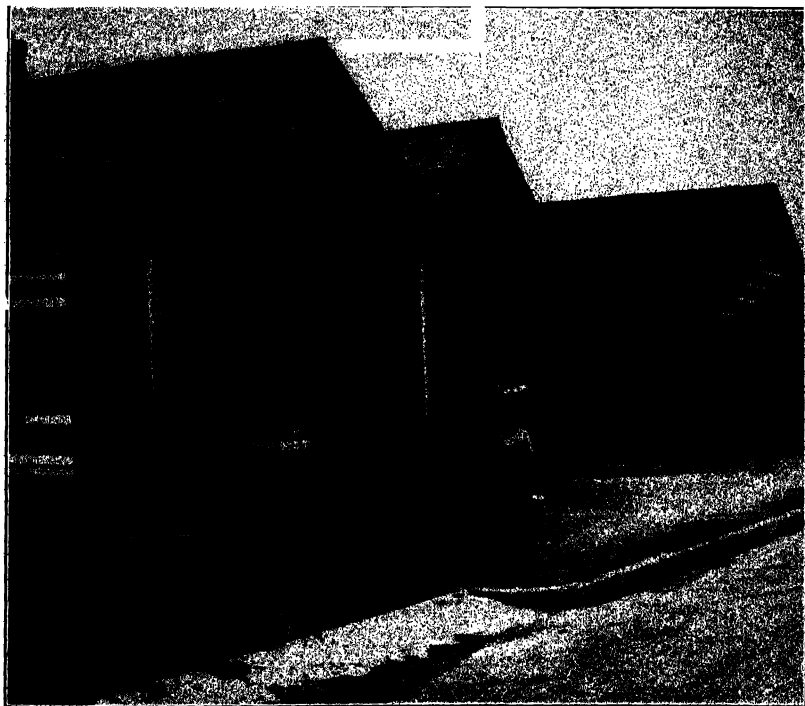
I. Aims of Study.

1. To analyze the value of our population and man power as a resource.
2. To examine the wastage of human life, the distribution of the national income, and the problems of our minority groups.
3. To review the basic facts of human biology in relation to ability, talent, genius, feeble-mindedness, crime, and insanity.
4. To see how our present social policies are tending to produce deterioration of our human stock.
5. To suggest a plan for conserving human resources.

II. People as a Resource.

1. Can human beings be conserved and planned for? Or should we confine our attention to "natural" resources? Indeed, is it permissible to think of people as a resource at all?
2. If we compute their actual dollars and cents value, we discover that people are our most valuable national assets.
- There are several ways of doing this:
 - (a) Dublin and Lotka, two life-insurance actuaries, computed the cost of production of an average child to be about \$10,485. On an adjusted scale this gives a total value to our man power of about \$1,000,000,000,000.
 - (b) O. E. Baker, an agricultural economist, computed the total net life earnings of the American people. On an adjusted basis this amounts to more than \$800,000,000,000.
 - (c) The simplest way of all is to capitalize our population on the basis of total wages and salaries earned in an average year. For this purpose one may use as the percentage rate the quotient derived by dividing total national income (minus wages and salaries) by the total value of all physical wealth in the United States. When this is done, the capitalized earning value of the American people appears to be approximately \$700,000,000,000.

3. These three methods yield valuations from \$700,000,000,000 to \$1,000,000,000,000, which is two to three times the value of all our "natural" resources. Even at that, our human resources are not as valuable as they should be. A large proportion of them is in poor repair, miserable, uneducated, and



Photograph by U. S. Housing Authority.

FIG. 44. Wasting human resources through slum housing. This also destroys valuable resources of civic pride and community beauty.

underprivileged. The "rich" cannot be blamed for this because, if all the national income in a normal year were distributed evenly, it would provide only \$1,500 per consumer unit. This is not enough to provide adequate living for all. This, of course, is aggravated by the fact that in the poorest one-third of the nation the average family or consumer unit income is only \$471 per year. This is an appallingly low figure. Only 2 per cent of American families have an income of more than \$5,000 per year during average years.

The whole matter of improving and conserving human resources is plainly a problem facing society in general, not a special responsibility for any small fortunate class of people or for private charitable organizations.

III. Conservation Problems.

1. The waste, neglect, and destruction of man power.
2. The depletion of talent, genius, and general biological quality in the population.

IV. How Man Power Is Wasted.

1. Low income—lack of necessities and satisfactions.
2. Unemployment—a serious and chronic problem even during years of “boom” and prosperity.
3. Sickness.
4. Accidents.
5. Infant mortality.
6. Mother mortality.
7. Lack of medical and dental care.
8. Delinquency, crime, and immorality.
9. Venereal infection.
10. Child labor and woman sweat-shop labor.
11. Slum living. (See Fig. 44.)
12. Ignorance—lack of education and training.
13. Poor consumer habits.
14. Neglected minorities—Negro, Indian, Mexican, and so forth.
15. War.

V. Remedies.

1. In general the remedies would appear to be:
 - (a) Education and more education (society now spends less on education than on liquor).
 - (b) Occupational planning and vocational training.
 - (c) Welfare work, relief, and rehabilitation.
 - (d) Social planning and large-scale improvement projects.
2. When one attempts to enlarge our present programs of education, vocational training, welfare work, and relief, a tremendous problem emerges: Large numbers of people cannot be educated to the extent desired. Biologically they are incapable of education or training beyond certain limits.

When relief or charitable aid is extended to needy people a second problem shows up. Such aid or relief provides these people with enough security that they increase their birth

rate and thereby produce more low-grade human beings. This in turn throws an increasing burden upon those people who produce a surplus income within society. From this, a whole new set of problems emerge.

3. These secondary problems are apparent only to those who know enough about human biology to be aware of the fact that, while certain shortcomings and undesirable traits of human beings are products of environment, certain others are inherent and passed on through heredity. Man, in the past, has never understood his own nature, and today most people are unaware of, or else choose to disregard, the facts recently brought to light by the growth of scientific research and analysis. A consideration of some of these, however, is prerequisite to any program for human conservation.

VI. Basic Considerations.

1. In primitive Stone Age times, men were, on the average, ugly, relatively clumsy, and very low in intelligence. Owing to the kind of life they lived, the law of society at that time was the "Survival of the Smartest and Fittest." Each generation saw a ruthless weeding out of the less agile and intelligent. At the end of several hundred thousand generations, man had, by reason of breeding only from selected stock, reached his present level of strength, looks, and intelligence. He still had a long way to go in developing education and culture, but he had achieved approximately the innate biological intelligence of modern man.
2. All through ancient and medieval history, man lived in a stratified society, in which the masses were never far above famine level. Wars, famines, and the struggle for existence continued in some measure the more rigorous weeding-out process of primitive times.
3. In modern times, the Renaissance, the Reformation, and the democratic revolutions in America and France started the break-up of this system. The Industrial Revolution, starting in England in the 1700's and spreading to other countries in rapid succession (Russia, Spain, Mexico, and China have felt it most recently), has accelerated its break-up.
4. All this has created a relatively new society based upon social and economic competition. The common supposition has been that the best human stock would come to the top and the worst would stay at the bottom.

This has proved partly fallacious, because economic success is often controlled by luck, health, education, social background, home environment, far-sightedness of parents, and so forth, as well as by the natural ability which is inherited.

Even though the supposition has proved to be partially true, the results have not been at all what was expected. Even naturally able people, in order to reach a desired status in life, have had to pursue a long period of education and training, often at great sacrifice and self-denial. This has postponed their marriage and reduced the number of their offspring. The number of offspring is further reduced by the foresightedness which such people show for their children's welfare.

Meanwhile, those who do not have either the ability or initiative to get ahead in a competitive society, marry early, produce many offspring, and throw the major responsibility for care of their offspring and for old age, sickness, and unemployment of themselves upon society. Superior people with few children pay most of the taxes to meet this responsibility. One generation of this kind of procedure is not significant, but our present permanent policy in this direction is indeed ominous. If primitive man evolved into an intelligent being by breeding only from the best stock, we are bound to degenerate if we breed predominantly from our worst stock.

5. The past century has seen a great deal of study directed toward the subject of heredity, Darwin and Galton being outstanding early investigators.

The so-called Mendelian Law (discovered by Mendel, an Austrian monk) presents the major facts about heredity. Mendel showed that by crossing a white sweet pea with a red one, for example, the offspring were not pink but tended to reproduce the separate parental traits in a definite ratio, depending upon which traits were dominant and which recessive. From his experiments it became obvious that hereditary traits were handed down through the germ plasm in two or more sets of genes which combine and recombine in different ways in each offspring. In general:

One-fourth of the offspring will resemble the recessive parent in any given trait and will in turn have offspring

of that type. Three-fourths of the offspring will resemble the dominant parent, but two-thirds of these will in turn occasionally produce offspring exhibiting the recessive traits.

6. This is a pretty accurate picture of heredity in all living things although it is by no means the whole story. If two people marry, one of them normal in intelligence and the other dull, all of their descendants will appear to be normal but at least three-fourths of them will be tainted by carrying in their germ plasm the genes of dullness or feeble-

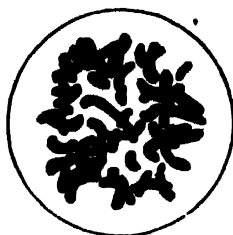


Fig. 45. Drawing of a microscopic photograph of human chromosomes which contain the genes of heredity.

mindedness. When two of these seemingly normal but actually tainted people marry, a large part of their children are feeble-minded. Then when two openly feeble-minded people marry, practically all their descendants are feeble-minded.

The children of purely normal parents will not be feeble-minded or moronic because those parents have not received any genes of dullness in their heredity. The presence in the American population of a large and rapidly increasing body of people who look normal but who actually carry the recessive genes of feeble-mindedness, is ominous to say the least. (See Fig. 45.) Moreover, the significance of dull people having more offspring than normal or bright people is rather alarming, if applied on a large scale over a long period of time, with all natural counteracting factors removed.

7. Binet in France, Hollingworth in America, and numerous other workers have made many studies of human intelligence and ability, and have devised achievement tests, aptitude tests, and intelligence tests—none of which is or can be wholly satisfactory because one can never separate entirely

natural inherited capacity from the results of training and environment.

Such tests are, however, satisfactory enough that with their aid we can for some purposes classify human resources into grades about as well as a geologist can classify ores or an economist can classify land or forest resources.

8. General intelligence grades of human resources:

Grade	Intelligence Quotient	Possibilities
Idiot	0	Cannot be trained.
Imbecile	20-50	Can be trained a little.
Moron	50-70	Can be educated a little (many of them look normal).
Borderline	70-80	Can finish elementary school (look like normal persons).
Dull	80-90	Can go to high school.
Normal	90-110	Can go to college.
Bright	110-120	Can get a master's degree and enter many professions.
Superior	120-140	Can succeed in nearly all professions.
Very superior	140-200	Can get a doctor's degree and make <i>important</i> discoveries and contributions to knowledge.

These grades of human beings are hereditary things, because like tends to beget like. Very superior parents produce very superior offspring, as regularly as moronic parents beget morons. Once in a very great while, a deviation occurs and the offspring is unlike his parents. He is a different type—a mutation. Mutations may be either monstrosities or geniuses depending upon whether they are desirable or undesirable. Society owes much to its geniuses, both good and bad.

9. The early settlers in America had been selected by many factors and were above the world average in intelligence, ability, and moral stamina. The Puritans, Quakers, Sephardic Jews, Unitarians, and Scotch-Irish immigrants were far above the average. Their descendants have continued to exhibit those traits.

The later immigrants were *unselected* and ran the scale from an I.Q. (intelligence quotient) of 50 on up. They have

produced offspring of mixed mental traits. Our immigration policy from 1860 to the present has been wholly stupid and has resulted in lowering the American average in intelligence quite measurably.

10. We now understand the major biological facts about human resources, but many people refuse to listen because such facts do not bear out their previous educational, social, or religious convictions or assumptions. Nevertheless, there can be no conservation in this field until we base our policies upon the scientific facts, unpalatable though some of them may be.
11. We may summarize the points made by pointing out that, at present, people who average above 110 I.Q. usually have 3 children or less, those with 90 to 110 I.Q. usually have 4 to 6 children, and those with an I.Q. below 90 frequently have 6 or more children.

In primitive times this was controlled by a struggle for survival; the stupid or defective starved, got killed, or failed to obtain a mate. In modern society, low-grade people are safer than bright ones. They are often exempt from military service. They will rear children without thought of their welfare. If they are unfortunate they receive charity (church or private), public relief (state), public employment (federal), or free clinic, dentistry, nursing, and maternity care (private or municipal).

Today the dull are increasing twice as fast as the normal and bright. The high-grade morons are probably increasing three or four times as fast. In connection with soil, minerals, or forest, such a situation would give us cause for national alarm. In connection with human resources, it is actually many times more alarming. It can lead only to a complete collapse of civilization through the destruction of the very factor which produced civilization. The more humane and altruistic we become, the worse we render the problem, unless we undertake to safeguard our altruism with the necessary scientific planning.

VII. A Constructive Program.

1. Establishment of a Department of Human Resources in the Federal Government to co-ordinate the vast amount of work now being done by separate agencies.

2. Most biological scientists advocate the following program.
 - (a) Minimum eugenic control and planning for high-grade human beings.
 - (b) Sterilization of morons, hereditary defectives, and depraved individuals.
 - (c) Sex education for the masses (college and high-school students are already demanding it in many localities).
 - (d) Elimination of venereal diseases.
(One out of every ten in America is said to have syphilis, and one out of every three or four has, or has had, gonorrhea.) There is no use handling it as a religious or moral problem any longer. We have tried this and it has failed utterly, no matter what we might wish.
 - (e) Establishment of birth-control clinics for the lower classes. (The middle and upper classes all over the world already practice birth control; they need it least.)
3. With this accomplished, two positive measures are needed.
 - (a) Economic encouragement for superior people (Japan is already experimenting with this).
 - (b) Thomas Jefferson's plan for selective education in order to obtain and subsidize leaders from all economic classes. (We now handicap rather than subsidize them.)
4. The next step might well be a very wide action program.
 - (a) Employment planning.
 - (b) Vocational training.
 - (c) Consumer education.
 - (d) Almost universal use of the Civilian Conservation Corps.
 - (e) Complete slum clearance. (See Fig. 46.)
 - (f) A resettlement program in connection with land planning.
 - (g) Individual rehabilitation, socialized medicine, social security, and pensions, and relief in full for all needy persons.
 - (h) Recreational planning for the nation.
 - (i) Finally, some attention to possible income redistribution for a constantly improving human stock.

VIII. The Teacher's Forum.

1. Suppose a well-intentioned businessman wants to conserve human resources by paying decent wages in a "sweat-shop" industry which is highly competitive. What happens to him?
2. What makes one man worth more to society than another? May the very qualities which make a man valuable in one situation make him a lia-

bility in another situation? Is a man like Mussolini, possessing command of an army, a liability or an asset to his nation? To humanity?

3. Why should one job pay more than another? If one man has greater innate ability or if his environment and training have made him more skilled than another, should the latter be penalized because of his poorer heredity or environment? What then is the justification for paying more for the services of some men? Do wage differentials regulate the flow of talent into occupations where it is needed? Is the question of *just deserts* involved in difference of wage levels?

4. Can we afford to allow higher-income groups to protect their higher earnings by restricting entrance into their fields? What is the significance of a minimum wage law in any occupational field?

5. Do most people, with potential ability to enter the activities for which there is the most demand by society, succeed in getting the necessary education? Is the reason financial or are there other reasons?

6. In a democratic society should there be as great a disparity in earnings as exists in America? How great should it be? Should wages in different occupations requiring the same ability be approximately equal? How do ability requirements and income compare in the following occupations?

Watchmaker and dentist.

Chemical engineer and professor of chemistry.

Plasterer and farm hand.

Automobile mechanic and tenant farmer.

Preacher and railway engineer.

7. Should the mentally deficient (say below 70 I.Q.) be penalized economically? On the other hand, should they be allowed to propagate? Dare we draw the line? Do we not draw lines all the time in this world?

8. What kind of a program might eliminate some of the present wastages in human resources? Would you attempt to allocate people to different occupations or could you devise a method whereby they would be able to find the places for which they are most suited?

9. What is the general attitude toward eugenics?

10. Can you think of a method for increasing the birth rate of intelligent people and decreasing that of dull people which would be acceptable to the public?

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¹ For publishers of these books, see reference list on pages 181-182.

CHAPTER XVIII

CONSERVATION PLANNING—SCOPE, PROBLEMS, AND PROGRAMS

I. Aims of Study.

1. To study the nature of and need for public planning in the United States.
2. To understand the relation between planning and conservation of resources.
3. To examine the planning process in connection with rural community, village, city, state, and nation.

II. Planning Defined

For many years, and in many different ways, our federal and state governments have collected basic data and made valuable statistical and other kinds of information about resources available to the public. The activities of government in relation to resources, however, are being noticeably extended in order to deal with the difficulties and problems of resource use which are today emerging in increasingly large numbers. In order to cope with such problems and difficulties, careful planning and formulation of future programs of management and use would seem to be essential.

In response to this need, special practices and procedures have been developed which are commonly designated as land planning, water planning, recreation planning, city planning, and so forth. Collectively they are frequently referred to as resource planning, or more frequently simply as "planning." The concept of planning in this sense has recently become world-wide. Practically all advanced nations are considering or have undertaken the formulation of resource-use programs. The motives underlying such planning are usually the same, or almost the same. The ends toward which it is directed or the way in which it is executed depends, however, entirely upon the social philosophy and the politico-economic ideology prevailing in a country. Planning, therefore, can be socialistic, monarchical-capitalistic, or democratic, depending upon who does it, how it is done, and what interests it is designed to serve.

Congressional Representative Maury Maverick expressed this idea in these words:

Thomas Jefferson was a believer in individual liberty. . . . But let us remember that he was the first man in America who advocated plowing on contours, conservation, reforestation, and the preservation of our natural resources. Not only that, but he advocated farm cooperatives—and some people tell us that is . . . socialism.

Yet neither Thomas Jefferson nor any man then living could have foretold the tremendously changed conditions in the United States of America today. And, of course, he did not have the integrated ideas of today on . . . planning and conservation by all our government units, but he did have the idea . . . within the limits of science of that day. . . . Planning may sound odious to some—but that is now possible through various agencies of government . . . and I see no reason why we should not “plan” to prevent dust storms, floods, diseases,—and save our country.¹

V. B. Stanbery, National Resources Planning Board consultant for Oregon, has defined planning as “merely the process of thinking ahead and predetermining the ways and means for bringing about a desired result. . . . Planning implies three fundamentals: a motive, an objective, and a means for its accomplishment, namely the plan. Forethought and selection are essentials of planning, which imply a conscious choice from among various alternatives.”

Planning is, therefore, the substitution of an orderly, purposeful, and harmonious method for developing resources, for the present hit-or-miss, conflicting, wasteful, disorganized method. It aims to look ahead, to determine what is needed in the present, what is necessary for the near future, and what is essential for the distant future.

Planning implies the ability and determination to make plans. It leads to the making of a land-use plan, a water-use plan, a forest plan, a plan for the use of each of the other classes of national resources. It consists of surveying and inventorying resources, classifying, and determining best uses; it seeks to change present uses which are wrong; it accepts, or suggests and outlines, public development projects; and it helps to determine the direction which private exploitation will take. It must be able to determine the priority among suggested present and future projects. It must be able to reconcile or eliminate conflicting or overlapping uses, and to reject destructive,

¹ M. Maverick, “A Permanent National Resources Board,” *American Planning and Civic Annual*, American Planning and Civic Association, Washington, D. C., 1936, pp. 149-151.

wasteful, or socially harmful projects. All of this means simply the application of intelligence to the human use of resources.

Planning is a continuous process; it is never finished. At least, it will never be finished until man is finished, or resource-use is finished, or both. It precedes and goes along with the continuing use of resources. It is aimed at co-ordinating that use, at determining the direction it will take, and at keeping it within bounds and proceeding according to the rules of the game. Even the rules can be changed when and if such changes are deemed necessary or desirable.

The plan itself, therefore, is flexible—a growing thing. Even the Master Plan which hangs in the borough or town hall is not a map showing the *final* picture of that borough or city. It is, rather, the picture which is envisioned at that particular date—subject always to rational change and improvement.

Not only is planning a continuing process, it is essentially a slow and long-range process. It implies, yes, even demands, continuity of policy and practice from generation to generation. The present lack of such continuity in resource use is one of the primary factors in making conservation so critically necessary. In general, there are three kinds of planning, or perhaps it would be more accurate to say three phases of planning:

1. Restrictive planning—the correction of abuses and wastes, and the prevention of additional abuses. This is the negative side of planning.
2. Constructional or positive planning—the initiation of new programs of resource use and the devisal of new forms of utilization.
3. Co-ordinative planning—the interrelating and facilitation of planning done by various other agencies.

The planning program includes the ordered use of both natural and human resources—in fact, of all resources which occur or are brought together within a given area or region. It amounts to a very varied and comprehensive program of action and treatment. The emergence of such an idea and the development of the planning technique are the logical and natural results of the gradual growth and expansion of the conservation idea itself—from its beginnings in the small-scale treatment of specific natural resources to its present recognition of the need for a large-scale integrated treatment of all resources as part of the general social program.

III. Generalizations.

1. More than half the American people now live in villages and cities. One would expect that a very great amount of atten-

tion would, therefore, be paid to the intelligent design and regulation of the urban environment. Strange to say, this is not the case

- 2 The city today is in a chaotic condition—a social tumor—the most conspicuous failure of western civilization. So bad



Photograph by U S Housing Authority

FIG 46 A low-cost housing project. Williamsburg Houses, New York City. These apartments replace twenty-five acres of slums but they do not touch those problems which produce slums. Such housing projects offer no advantages for the rearing of children; they merely eliminate some of the evils of slums.

is it, that no city with more than 100,000 inhabitants seems to be able to reproduce its own population.

3. All American cities are "land-starved" and yet there is no scarcity of land in the United States. This is the result of our faulty treatment of urban land and our permitting of urban land speculation. (See Fig. 46.)
4. City growth in itself is not bad, but the way in which our cities have grown is decidedly bad. Growth has depended

upon individual profits and not on the needs of the community.

5. Mere aggregation is the only *natural* law governing urban growth. Left to the operation of that natural law, cities have become unbelievably inconvenient, ugly, and wasteful. They now threaten to become the drying-up points of our entire civilization. Their planless congestion, lack of facilities for rearing children, destruction of home and community life, are threatening the very continuance of our native American culture and offering nothing save a rootless neo-barbarianism in exchange. This is as unnecessary as it is undesirable.
6. The suburban town was developed originally by people seeking to escape the evils of the big city without losing all its advantages. As it has grown in size, it has, because of its planlessness, taken on all the evils in miniature which the metropolis itself possesses. Moreover, as the metropolis has grown and overflowed its bounds, the fate of the suburb either has been or threatens to be that of being swallowed up in the monotonous chaos of the city.
7. The detached town or village also is suffering from its own characteristic set of troubles. It has usually been built with no regard for esthetic principles. It has often found itself athwart the motor highway, subject to invasion by those agencies and interests which thrive along the edges of highways. It has been subjected to a long-continued drain from the city. It has lost small industries, certain types of business, and most of its abler people.

Its resources, both physical and human, have often deteriorated under metropolitan competition. Its social life and communal unity have tended to decay. It has educated its youth only to lose them to the metropolis, which has thus received their services without paying the cost of education and training. In those cases where the town or city has gone ahead and developed it has almost invariably done so at the cost of producing congestion and sacrificing facilities for living.

8. The rural farm or ranch community has in most instances shown a marked decline during the past few decades. The advent of the automobile and the paved road caught such small social units without any community plan, and hence wholly unprepared to meet competition from the town movie,

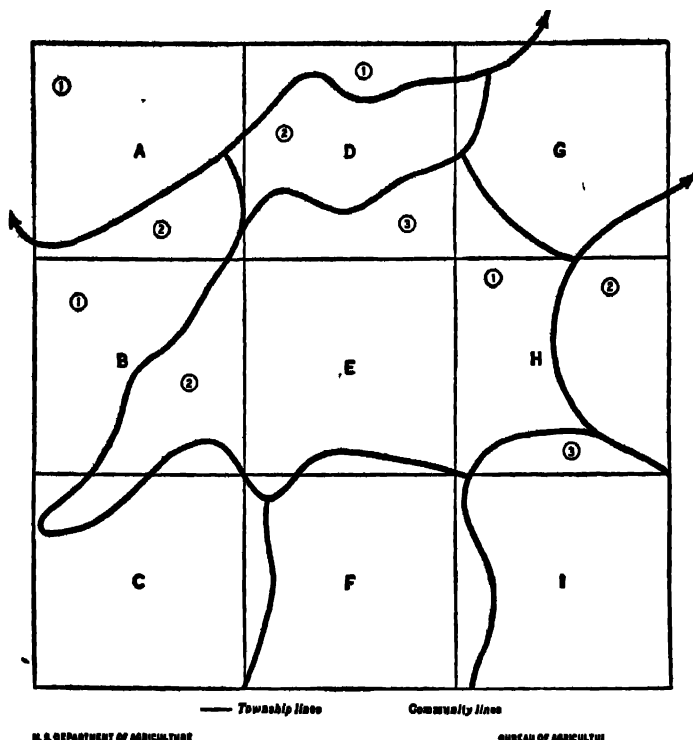


FIG. 47. A sample map of nine townships with actual community boundaries drawn over them. Such lines were drawn on the basis of the response of people when township meetings were called. In township A the people from the A_1 part of the area did not appear to be interested in what was going on. The B township was somewhat better in this respect, but people from B_2 seemed to be more interested in other things. In C , F , and I townships the situation was more satisfactory, for people attended meetings and seemed interested. In the H area it was difficult to get people out to meetings and when they did attend, they were inclined to divide into two groups. The response was good in E , fair in D , and not so good in G .

A survey revealed that the A_1 and D_1 areas were a part of a larger community whose center was outside the county. The B_2 area was a part of the community whose center was in E . The C , F , and I township lines corresponded very closely to the community lines. The H_1 area was a part of the community, while H_2 was struggling to maintain its own identity, wanting to have as little as possible to do with H_1 . The G township was experiencing a number of changes, among which was the loss of an industry. Holding to township lines resulted in less effective working groups in the A , B , D , and H townships.

(Ensminger, D., "The Community in County Planning," *Land Policy Review*, Vol. III, No. 2, March-April, 1940, p. 49.)

church, band concert, and other attractions. (See Fig. 47.) Today, the country church may be boarded up, the grange hall rented out as a corn crib, and the school merged in a consolidated district. The older community members usually retire to the near-by town; the sons and daughters migrate to the city; and land passes to the hands of renters and croppers. Forest depletion, soil erosion and exhaustion, the silting up of streams, and the disappearance of wildlife further impoverish the local area. The American farmer has begun his plunge toward peasantry, just as his city brother has achieved his slums and his miles of dreary flats and hive-like apartments, his ghettos and his gangs.

IV. The Major Problems of Planning.

1. Problems of the city.

- (a) Any city contains a number of important functions: residence, retail business, wholesale business, finance, manufacture, government, cargo handling (water or land), passenger transportation, institutional activities, and recreation.

Each of these activities or functions is quite different in the social environment which it creates and which it needs for its success. Each of them, therefore, needs a distinct area for its purpose, separated from other land-use areas. Because most cities have been built without any plan, these urban land uses have not been kept separated. They encroach upon one another, destroy one another's values, and create many kinds of evils, abuses, and forms of waste.

- (b) Because most cities have had no plan, there has been a continual contest for possession of land by various forms of land use. As a consequence, there is an unbelievably large amount of waste through the incessant tearing down and rebuilding of various parts of the city.
- (c) This same planlessness of cities has occasioned a partial, and in some cases an almost complete, breakdown in transportation. Street congestion in most cities has become fantastic.
- (d) Permitting speculation in urban land has produced overvaluation of land, and this has created a too great density of population. This, in turn, has aggravated the transportation problem. Because of the pressure of this density of population, we have made streets too narrow,

left insufficient space for parking and for transit lines and terminals, and created special points of traffic congestion and hazard.

- (e) Further results of the overvaluation of urban land are:
 - (1) Housing congestion, tenement living, and slums.
 - (2) Inadequate park and open space.
 - (3) Inadequate areas for play and recreation.
 - (4) Removal of man from contact with nature.
 - (5) Almost no facilities for children to have natural play and work experiences which they need for character development. (Indeed, the city greatly impoverishes the life experiences of children.)
 - (6) Gardens have become a luxury available only to the rich who can afford country estates.
 - (7) Increasing patronage of unwise forms of recreation and amusement.
 - (8) Increase of crime, child delinquency, and other social problems.
 - (9) Necessity of high taxes to pay for the cost of social and economic control and for expensive remedial or counteractant measures.

2. Problems of the rural community.

- (a) A rural community is composed of several related rural neighborhoods. (A neighborhood is an area within which the inhabitants *know* one another; a community is a larger area whose inhabitants *know of* one another.) A community possesses interests, incentives, and loyalties in common. These should be utilized and planned for. They should be harnessed to the conservation and the development of all resources for living. Many of these resources are undeveloped or inadequately utilized.
- (b) Rural community centers for political, educational, social, vocational, religious, and recreational purposes are usually lacking or are imperfectly developed.
- (c) The social and economic organization of the rural area is imperfect, and leadership is untrained. Library and medical services are poor and inadequate. Recreational services are poorly utilized or undeveloped.
- (d) Vocational opportunities aside from farming or ranching are undeveloped.
- (e) Public services and facilities are usually poor because of the scattered pattern of rural settlement. Such settle-

ment is usually not necessary but is the result of historical factors.

3. Problems of the village.

(a) The village or small city faces a number of crucial problems, although, in this modern age of travel and machinery, it has on the average preserved resources for living better than either rural country or metropolis. Chief among its problems is the employment for youth. We hear much about the need for decentralizing the big city and the redistribution of industries to smaller towns. The smaller towns have so far done nothing to make this possible.

(b) Other needs of the small urban center are:

- (1) Lack of community beautification and esthetic improvement.
- (2) Lack of a center and an organization for community life.
- (3) Lack of adequate contact and relation with rural areas.
- (4) Lack of systematic utilization of local natural resources and progressive deterioration of unused assets.
- (5) Lack of any plan for guiding the physical pattern of the community.

4. Problems of larger areas.

(a) The county.

- (1) In many parts of the nation, tax-delinquent and abandoned cut-over forest land and submarginal farmland revert to the county. The proper management and disposal of such lands are most properly problems of the county.
- (2) The building and maintaining of a system of local roads are county functions which often involve such questions as the pattern of land utilization, the distribution of rural settlement, and the provision of rural public services.

(b) The state.

- (1) The state is the real unit of sovereignty and power in American government. Upon it, therefore, falls the primary task of properly utilizing and conserving our natural and human resources. Soil, water, minerals, wildlife, forest, public health, and other

forms of wealth are the special responsibility of the state. In general, it has badly neglected this responsibility and concerned itself more especially with political activities.

- (2) State tax laws have generally not favored or even permitted conservation.
 - (3) There has been almost no continuity in state resource policies.
 - (4) State-owned resources have been neglected, often mismanaged and wastefully administered.
 - (5) State forest, range, wildlife preserve, and recreation land are, in many instances, wholly inadequate for present needs.
- (c) The nation.
- (1) Our Federal Government is in many respects an international union of sovereign states or nations. It is therefore without any inherent power except that it exercises such prerogatives as the states have granted it. There is altogether too great a tendency for the local and state governments to shirk unpleasant tasks and assume that they are the duties of the Federal Government. Needless to say, federal powers have grown in direct proportion to the unwillingness of the states to perform their original functions. The major problem of our national government is to perform the increasing tasks of conservation and planning which the states have thrust upon it. Some of these are:
 - a. To develop an increasing program of planning for human resources and social welfare.
 - b. To increase the size and quality of the public domain to the limits of the needs of the American people.
 - c. To grant funds and benefits to individuals, cities, and states in furtherance of desired programs.
 - d. To build major highways, parkways, and other public works.
 - (2) There are, however, a number of things which are traditionally the legitimate province of the Federal Government, such as:
 - a. To administer the natural resources of the public domain.

- b. To improve harbors and navigable rivers and construct major canals.
- c. To undertake giant improvement projects which are interstate in scope.
- d. To co-ordinate and stimulate state and perhaps even local planning.

V. Remedies.

1. For the city.

- (a) Zoning laws, smoke ordinances, tenement regulations, and housing projects. (These, however, are not cures; they are only drugs to deaden the pain.)
- (b) City planning directed toward the following eight basic elements of a city plan:
 - (1) Definite zones or districts for different land uses, legally enforced by a zoning law.
 - (2) An improved pattern of streets.
 - (3) A waterfront (if adjacent to a water feature).
 - (4) A system of parks connected by parkways.
 - (5) A civic center with public buildings grouped about it.
 - (6) Public reservations—public parking areas, adequate playgrounds closely integrated with residential areas, a town forest, airport, etc.
 - (7) Definite routes for public utilities—sewers, bus lines, railways, water, gas, and electric lines, telephone lines, etc.
 - (8) A permanent "Greenbelt" surrounding the city, which will limit the expansion of the city and prevent its encroachment upon suburbs and rural areas and will maintain the permanent contact of the city with the country. (Further population increase will therefore result not in a larger city but in the development of tangential satellite cities.) Moreover, such city planning should produce a master plan to guide the city's development; it should be done by a Planning Commission which possesses definite standards of efficiency and beauty. It should have public interest and support and a zoning law to enforce the plan. (See Fig. 48.)
- (c) Decentralization of urban industry where feasible, with the development of a new "rurban" pattern of living.

This would place most workers on small farms as insurance against periods of industrial unemployment or financial depression.

- (d) Many "Garden City" projects. This is not a real-estate term. It is, according to English law, an entirely new kind of city, built deliberately for better human living and greater industrial profits. It is a planned combination of rural and urban advantages without the disadvantages.
 - (e) Self-help co-operatives for urban "unemployable" classes, based upon handicraft and salvage industries. This should replace as far as possible the present system of charity and public relief.
2. For the village.
- (a) A co-operative conservation and planning association.
 - (b) A town planning board, with occasional services of a trained consultant planner.
 - (c) A village Master Plan, with especial emphasis upon a civic center and a permanent peripheral belt of agricultural land.
 - (d) A zoning ordinance.
3. For the rural community.
- (a) A rural planning club with co-operative conservation programs.
 - (b) A program of community reorganization involving the development of:
 - (1) Trained rural leadership.
 - (2) Scouting and 4-H Clubs.
 - (3) AAA activities.
 - (4) Farmers' co-operative societies covering every aspect of economic life—as in Denmark.
4. For the county.
- (a) A county zoning program with a division of land into major use-districts. (See Fig. 30.)
 - (b) A planned redistribution of population in order to obtain improved public services. To indicate the need for, and possibilities in, such a procedure, one small example may suffice.

In those parts of the nation where the rectangular land survey exists, each township consists of square farms arranged within a grid of 72 miles of public country roads, plus many miles of private lanes, which have

to be maintained at appalling expense. Such a settlement pattern does not permit reasonable access to church, school, or community center. It makes difficult the provision of mail delivery, electric light and power, and telephone service. It precludes entirely sewer lines and delivery service from city stores.

C. P. Barnes has pointed out that if farms were changed from squares to long rectangles, and if homes

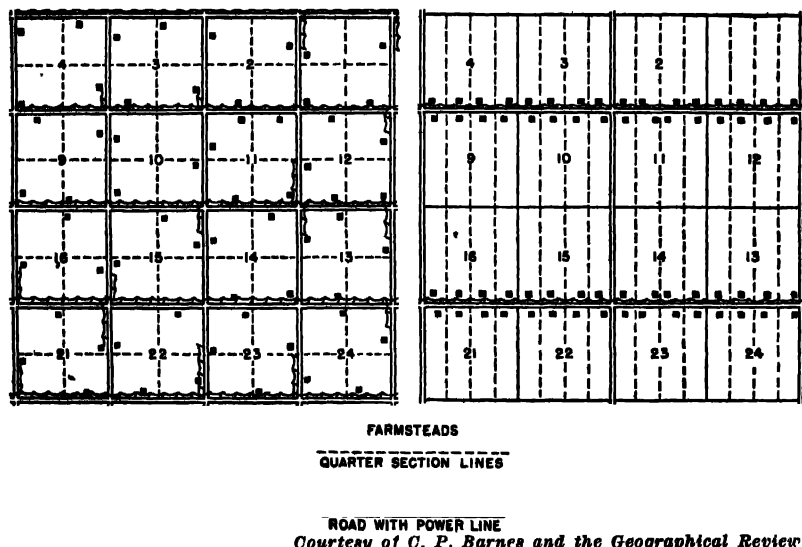


FIG. 49. Public services in relation to long-lot farms versus square farms.

were permitted, say, only on alternate east-west roads, the results would more than justify the plan. Rural road mileage could be reduced from 72 to 18 miles per township. It would then be possible to gravel or pave and keep free from snow all the remaining roads. There would result a minimum of eight farm families per mile of road—a density sufficient to obliterate rural isolation. The rural picture then would consist of hard-surfaced, tree-bordered roads, fronted by a continuous line of farmhouses, enjoying mail delivery, electric light, bus service to church, school, and town, parcel delivery service from city stores, and many other conveniences. All that is required is human ingenuity and initiative. (See Fig. 49.)

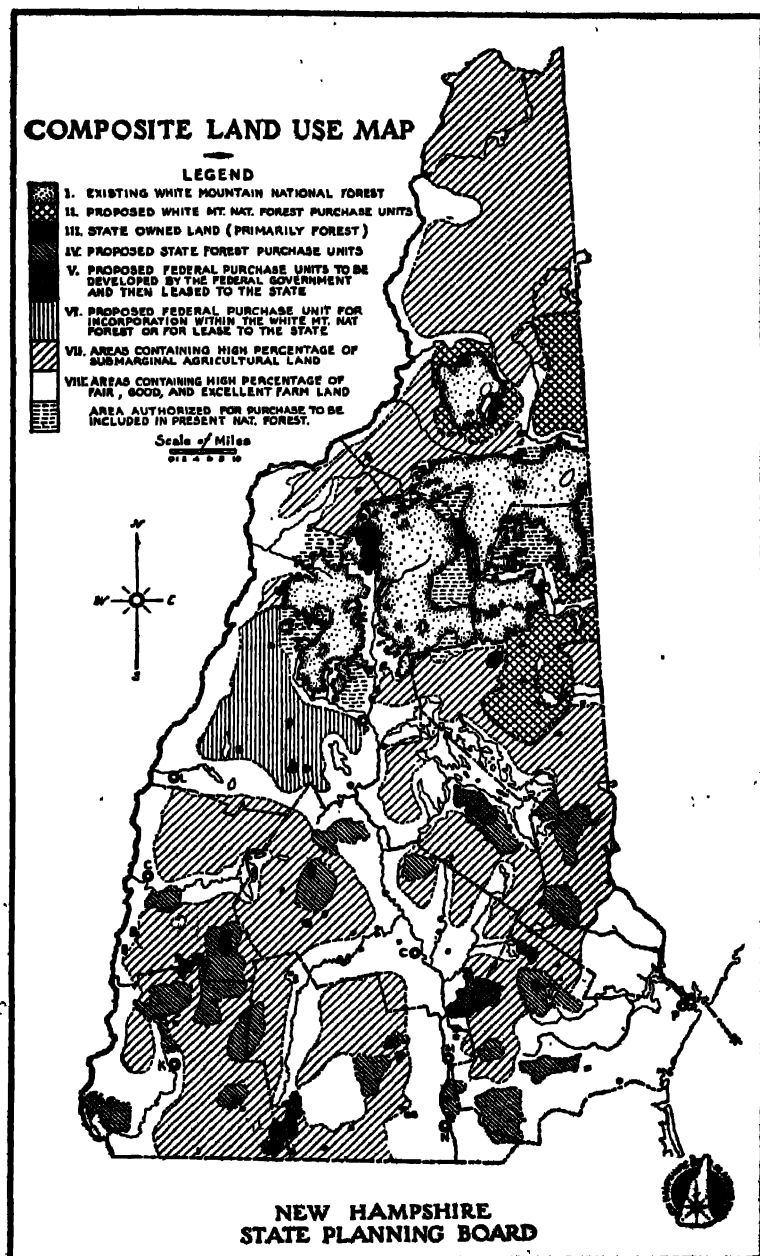


Fig. 50. The foundation of a state plan for New Hampshire.

5. For the state.

- (a) A state planning board with strong powers—some of them mandatory, some advisory, and some prohibitory (involving veto).
- (b) A state master plan or integrated plans for the use and development of all major classes of state resources. (See Fig. 50.)

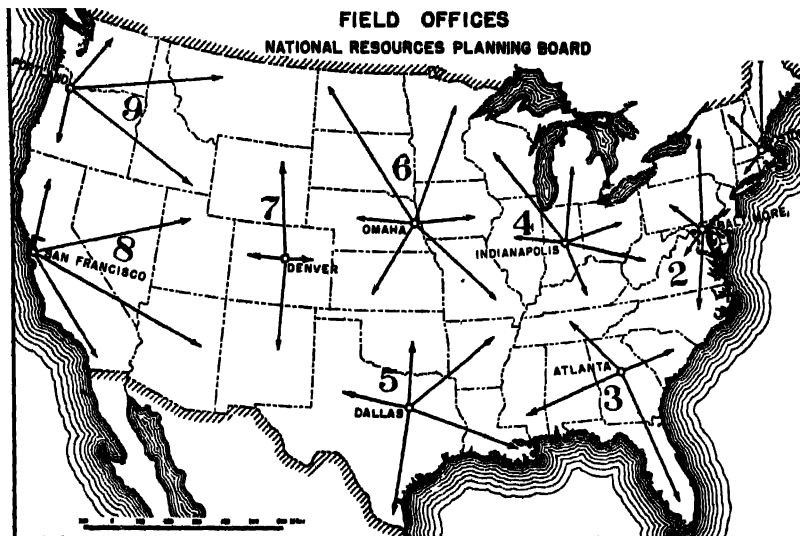


FIG. 51. The National Resources Planning Board does its national planning through regional field offices.

- (c) The reorganization of counties and school districts within the state.
 - (d) The co-ordination of local plans and programs.
6. For the nation.
- (a) A permanent National Planning Board independent of, but co-ordinate in powers to, the President, the Congress, and the Supreme Court.
 - (b) Definite programs of resource planning on a large regional basis, for such fundamental regions as the South, the East, the Midwest, the Great Plains, the Pacific Northwest, the Pacific Southwest, and the Intermountain Country. (See Fig. 51.)
 - (c) The development of each subnational region along economic and cultural lines best suited to its resource equip-

ment. This may be done through a combination of two processes.

- (1) Decentralizing the activities of the federal departments to regional centers.
- (2) Recentring many of the state planning activities in these same regional centers and co-ordinating them with federal departmental activities there.
- (d) Preparation of large national policies to guide the states; preparation of policies and lists of priorities to guide legislation by the Congress, with perhaps veto power for all legislation which runs counter to the national plan.

VI. The Teacher's Forum.

1. What are the factors which tend to keep urban families small? Suggest the reasons why the death rate in cities of more than 10,000 is about 20 per cent higher than in the remainder of the country. Where are the best medical services in the nation? What do you conclude regarding our cities?

2. What are the elements of a city plan? Define the terms: planning, zoning, condemnation, public purchase, eminent domain, police power, garden city. Which offers most promise in dealing with urban problems, city planning or the construction of garden cities?

3. What are the steps in developing state planning? Who should be included in the state planning board? What are the items which should go into your state plan? What are the steps in developing a state plan? What are some of the problems with which a state cannot deal?

4. Why is a large amount of population resettlement essential to wise and desirable land use? Does resettlement and rural zoning violate our traditional principle of individual rights? Why?

5. What major problems are studied by national planners? In much of their work why is some sort of *regional* planning approach almost imperative? What are the basic cultural regions in our nation? Are they preferable as planning units to regions which might be laid out on drainage, soil, business activity, or purely arbitrary lines? Why? Are states good regional units for national planning? Why?

6. What is the Tennessee Valley Authority? What are the weaknesses of a drainage basin as a regional *planning* unit? Do these weaknesses also apply to it as a *conservational development* unit? Why are these two considerations not the same? What was the purpose in creating the TVA? Will it achieve this purpose?

VII. The Teacher's Bibliography.

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- BASSETT, E. M., *The Master Plan*, Russell Sage Foundation, New York, 1938.
- CHASE, S., *Rich Land, Poor Land*, McGraw-Hill, New York, 1936, Chapters XIII, XIV, XV, and XVI.
- CLARK, F. P., "The New Village of Hill, New Hampshire," *The Planners' Journal*, Vol. 7, No. 1, January-March, 1941, pp. 1-12.
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- Federal Housing Administration, *Planning Profitable Neighborhoods*, Technical Bulletin 7, Government Printing Office, Washington, D. C., 1938.
- GAUS, J. M., J. CRANE, M. E. DIMOCK, and G. T. RENNER, *Regional Factors in National Planning and Development*, National Resources Committee, Government Printing Office, Washington, D. C., 1935.
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- HOWARD, E., *Garden Cities of Tomorrow*, Sonnenschein, London, 1902.
- HUBBARD, H. V., "The Appearance of the City," *The Planners' Journal*, Vol. 3, No. 1, January-February, 1937, pp. 1-8.
- HYNNING, C. J., *State Conservation of Resources*, National Resources Committee, Government Printing Office, Washington, D. C., 1939, Chapter 6.
- KINNEMAN, J. A., R. G. BROWNE, and R. S. ELLWOOD, *The American Citizen*, Harper, New York, 1936, Chapter 16.
- LEWIS, H., *City Planning, Why and How*, Longmans, Green, New York, 1939, 257 pp.
- NASON, W. C., *Rural Planning—The Village*, Farmers' Bulletin 1441, Department of Agriculture, Government Printing Office, Washington, D. C., 1933 (important).
- National Resources Committee, *The States and Planning*, Government Printing Office, Washington, D. C., 1939.
- National Resources Planning Board, *Housing, the Continuing Problem*, Government Printing Office, Washington, D. C., June, 1940.
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- TUGWELL, R. G., *The Fourth Power*, American Institute of Planners, Hunt Hall, Cambridge, Mass., 1939, 31 pp.
- WHITE, C. L., and G. T. RENNER, *Geography—An Introduction to Human Ecology*, Appleton-Century, New York, 1936, Chapter XXXI, "The City."

VIII. Textbook References.²

1. PARKINS and WHITAKER, *Our Natural Resources and Their Conservation*, Chapters XXIII and XXIV.

² For publishers of these books, see reference list on pages 181-182.

2. BRINSER and SHEPARD, *Our Use of the Land*, Chapter VIII.
3. FLYNN and PERKINS, *Conservation of the Nation's Resources*, Chapter 11.
4. RENNER and HARTLEY, *Conservation and Citizenship*, Unit IX.
5. BAYLOR, *Saving Soil and Water*, Lessons XIV and XV.
6. GLOVER, *America Begins Again*, Chapters IX and X.
7. ELLIOTT, *Conservation of American Resources*, Unit XII.
8. BRUNER and SMITH, *Conserving Our Natural Resources*, p. 21 and Section VI.

PART III

CURRICULUM, METHODS, AND MATERIALS

CHAPTER XIX

GENERAL MATERIALS FOR CONSERVATION EDUCATION

It is not enough for teachers to be imbued with a strong desire to teach conservation and for them to be adequately informed on the principles, scope, and objectives of conservation. They must be able to put abundant and properly organized subject-matter materials into the pupil's hand.

Generally speaking, it would have been almost impossible to have taught conservation to school children prior to the year 1909. (See Fig. 52.) There were no textbooks nor readily adaptable source materials available for pupil use. In that year the Report of the National Conservation Commission was published, a circumstance which changed the entire educational picture.

In 1910, Professor C. R. Van Hise wrote his classic book, *The Conservation of Natural Resources in the United States*, which he himself described as a general handbook giving an abbreviated general statement about our major resources, and the relations of the subject as a whole to humanity. This book was a highly successful attempt to codify, digest, and reshape the materials of the Conservation Commission's report into a form useful for educational purposes.

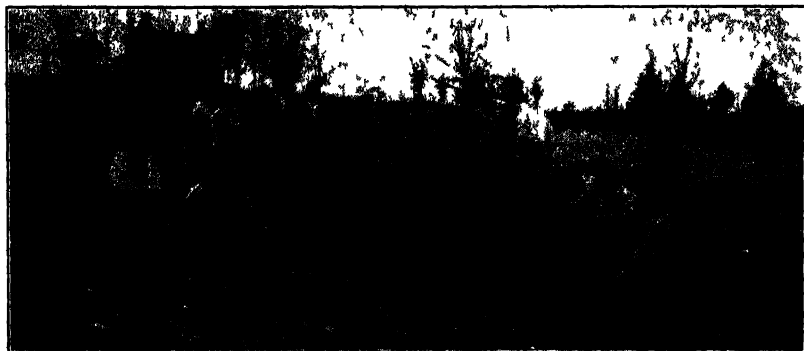
Almost immediately this book came into fairly general use as a textbook for college courses in conservation. Such courses were generally offered in the departments of geography, geology, and even occasionally economics. Certain special aspects of conservation also came to be taught in forestry, fisheries, and agricultural economics. From such courses have come the fairly large numbers of conservation-minded teachers and citizens whose influence is today being felt in America. For progress during this period of educational gestation, we owe a debt to many leaders. Our debt is especially heavy to those great teachers of men: C. R. Van Hise, Harlan H. Barrows, J. Russell Smith, H. H. Bennett, George S. Wehrwein, L. C. Gray, W. C. Lowdermilk, and J. N. Darling (Ding).

For twenty-six years, Van Hise's book was the standard book on conservation, twenty years without revision and six years as revised by Havemeyer. In 1936 it was very largely superseded by a co-operative textbook written by twenty-three American geographers and

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edited by A. E. Parkins and J. R. Whitaker. This book was the result of the increasing volume of published reports which began to issue from the offices of governmental agencies, notably that of the National Resources Planning Board, from 1933 on. It was an educational selection and synthesis of materials produced or stimulated by the Franklin Roosevelt Administration, just as Van Hise's book was based upon those produced during the Theodore Roosevelt Administration..

As early as the 1920's, however, significant and usable government materials commenced to appear here and there. Conservation began



Photograph by Soil Conservation Service

FIG. 52. Alamance County, N C, biology students see at first hand how gullies develop and learn about conservation measures for preventing them.

to be mentioned in college textbooks in geography, forestry, and agricultural economics. Even lower-school geography textbooks made occasional mention of it. Elementary readers in nature study also started to develop the conservation motif. Numerous popular and semipopular articles on conservation began to appear in magazines and professional and trade journals. Worthy of especial note was Wilbur and Du Puy's, *Conservation in the Department of the Interior*, in 1932, and the Report of the Committee on Social Trends in 1933.

After 1934, conservation was "discovered" by the public. Cartoons appeared; books such as *Deserts on the March*, *Rich Land, Poor Land*, *Grapes of Wrath*, and others became best sellers. The economists, historians, sociologists, and natural scientists began to accord it educational attention. The new social studies proponents have taken it up, the visual educationists have given it much study. The National Education Association and the Progressive Education Association have officially recognized it, and educators in general now give some indica-

tion of realizing its significance and import. There is no longer any general dearth of materials for conservation education. Rather, the volume of materials has already become so large that the problem of locating, choosing, and winnowing has become a major one.

TEXTBOOKS

Properly employed and used by an adequately trained and competent teacher, a textbook is the most important single instrument in the educative process. Opinion has been, and is, divided as to the advisability of having national or general textbooks in conservation. Despite this, there have appeared recently textbooks of such high quality and adaptability that the question now seems to be answered in the affirmative. Indeed, suitable textbooks are now available at nearly every level of teaching, as exemplified by the following representative suggestions:

University

1. PARKINS, A. E., and J. R. WHITAKER, *Our Natural Resources and Their Conservation*, Wiley, New York, 1939, 647 pp.

College

1. GUSTAFSON, A. F., *et al.*, *Conservation in the United States*, Comstock, Cornell Heights, Ithaca, N. Y., 1939, 445 pp.

Teacher's College, Department of Education, and Normal School

1. RENNER, G. T., *Conservation of National Resources—An Educational Approach to the Problem*, Wiley, New York, 1942, 228 pp.

High School

1. BRINSEB, A., and W. SHEPARD, *Our Use of the Land*, Harper, New York, 1939, 303 pp.
2. FLYNN, H. E., and F. E. PERKINS, *Conservation of the Nation's Resources*, Macmillan, New York, 1941, 385 pp.
3. RENNER, G. T., and W. H. HARTLEY, *Conservation and Citizenship*, Heath, Boston, 1940, 367 pp.

Junior High School

1. GLOVER, K., *America Begins Again*, McGraw-Hill, New York, 1939, 382 pp.

Upper Elementary School

1. ELLIOTT, C. N., *Conservation of American Resources*, T. E. Smith & Co., Atlanta, 1940, 672 pp.

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Intermediate Grades

1. BRUNER, H. B., and C. M. SMITH, *Conserving Our Natural Resources*, C. E. Merrill Co., New York, 1938, 136 pp.

Primary Grades

1. RAYMOND, ANNE, *A Teaching Unit on Land and Water for Beginners*, 2 parts, mimeographed U. S. Département of Agriculture, Region 8, Soil Conservation Service, Albuquerque, N. M., Regional Bulletin 2, 1936, 25 pp.

REFERENCE MATERIAL FOR THE TEACHER

The teacher should, of course, strive to build up an adequate working library of reference materials for his own orientation and use. No specification can be laid down for such a library save that it should probably include most of the following items as a foundation:

1. ADAMS, T., *Outline of Town and City Planning*, Russell Sage Foundation, New York, 1935.
2. BENNETT, H. H., *Soil Conservation*, McGraw-Hill, New York, 1939.
3. FIELDER, R. H., *Fishery Industries of the United States*, Bureau of Fisheries, Administrative Report 27, Government Printing Office, Washington, D. C., 1938
4. FORD, J., *Slums and Housing*, Harvard University Press, Cambridge, 1936.
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6. National Resources Board, *State Planning*, Washington, D. C., 1935.
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9. National Resources Committee, *Regional Factors in National Planning and Development*, Government Printing Office, Washington, D. C., 1935.
10. ROBINSON, G. W., *Soils, Their Origin, Constitution and Classification*, Van Nostrand, New York, 1932.
11. SMITH, J. R., *Tree Crops*, Harcourt, Brace, New York, 1929.

12. SMITH, J. R., and O. M. PHILLIPS, *North America*, Harcourt, Brace, New York, 1940.
13. U. S. Department of Agriculture, *The Western Range*, Senate Document 199, 74th Congress, 2nd Session, Government Printing Office, Washington, D. C., 1936.
14. U. S. Forest Service, *A National Plan for American Forestry*, 2 vols., Senate Document 12, 73rd Congress, 1st Session, Government Printing Office, Washington, D. C., 1933.
15. VOSKUIL, W. H., *Minerals in Modern Industry*, Wiley, New York, 1930.
16. WHITE, C. L., and G. T. RENNER, *Geography—An Introduction to Human Ecology*, Appleton-Century, New York, 1936.

REFERENCE MATERIALS FOR THE STUDENT

The materials available for pupil use are becoming truly overwhelming in quantity and variety. The problem in dealing with them is mainly making a minimal selection. A preliminary bibliography, by topic and by grade level, has been issued as: *Helps in Teaching Conservation in Wisconsin Schools*, Curriculum Bulletin, Vol. 1, No. 2, by the State Superintendent of Education, Madison, Wisconsin. The teacher will do well to use this as a basic guide in building a student library. A general selection for student use might possibly include the following items:

1. BAKER, A. O., and L. H. MILLS, *Dynamic Biology*, Rand McNally, Chicago, 1933.
2. BETHUNE, M. M., *The Tenth Youth*, Division of Negro Affairs, National Youth Administration, Washington, D. C.
3. BRUÈRE, M. B., *Here Are Forests?*, Forest Service, U. S. Department of Agriculture, Government Printing Office, Washington, D. C., 1936.
4. CHASE, S., *Rich Land, Poor Land*, McGraw-Hill, New York, 1936.
5. CHASE, S., *The Tragedy of Waste*, Macmillan, New York, 1925.
6. HARRIS, G., *Elements of Conservation*, Johnson Publishing Co., Richmond, 1924.
7. Great Plains Drought Committee, *The Future of the Great Plains*, Government Printing Office, Washington, D. C., 1936.
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9. HOUSE, H. D., *Wild Flowers*, Macmillan, New York, 1936.

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12. KALLET, A., and F. J. SCHLINK, *100,000,000 Guinea Pigs*, Vanguard, New York, 1933.
13. KING, F. H., *Farmers of Forty Centuries*, Harcourt, Brace, New York, 1929.
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15. LORD, R., *To Hold This Soil*, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C., 1938.
16. National Park Service, folders for each national park, issued annually, U. S. Department of the Interior, Washington, D. C.
17. National Resources Planning Board, *Our National Resources—Facts and Problems*, Government Printing Office, Washington, D. C., 1940.
18. PERSON, H. S., *et al.*, *Little Waters*, Government Printing Office, Washington, D. C., 1935.
19. ROLFE, M. A., *Our National Parks*, 2 vols., Sanborn, Chicago, 1928.
20. SEARS, P. B., *Deserts on the March*, University of Oklahoma Press, Norman, 1935.
21. SMITH, J. R., *Men and Resources*, Harcourt, Brace, New York, 1937.
22. Soil Conservation Service, *Ten Billion Little Dams*, U. S. Department of Agriculture, Washington, D. C., 1936.
23. TIPPETT, J. S., *Paths to Conservation*, Heath, Boston, 1937.
24. U. S. Department of Agriculture, *Common Birds in Relation to Man*, Farmers' Bulletin 497, Washington, D. C.

AIDS FOR THE TEACHER

A number of practical aids for the teacher of conservation are available. Some of these are suggestions as to teaching procedure, class motivation, educational aims, and learning objectives. Others are bibliographies, sources of material, and suggestions for the preparation of subject matter. Some of the more important of those available are:

Teaching of Conservation in Wisconsin Schools, Curriculum Bulletins, Vol. I, No. 1, May, 1937, State Superintendent of Education, Madison, Wisconsin.

Helps in Teaching Conservation in Wisconsin Schools, Curriculum Bulletins, Vol. I, No. 2, May, 1938, State Superintendent of Education, Madison, Wisconsin.

BRISTOW, W. H., and K. M. COOK, *Conservation in the Education Program*, Office of Education, Government Printing Office, Washington, D. C., 1937.

American Legion, *Conservation of Natural Resources* (A Community Service Program), Indianapolis, Indiana.

Conservation Week—A Manual for Teachers, State Office of Education, Trenton, New Jersey.

Conservation Education, State Office of Education, Bulletin 214, Harrisburg, Pennsylvania.

Soil Conservation, October, 1940 (special educational number), Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C.

RENNER, G. T., and W. H. HARTLEY, *Conservation and Citizenship*, Heath, Boston, 1940. Each unit provides introductory and culminating activities for class use.

Superintendent of Documents, *Price Lists of Government Publications*, Government Printing Office, Washington, D. C.

KRONENBERG, H., et al., *Pamphlets on Public Affairs for Use in Special Studies Classes*, Bulletin 8, 1937. National Council for the Social Studies, Cambridge, Mass. (a list of inexpensive pamphlets, many of which deal with conservation)

Bibliographies are found in most textbooks and reference books on conservation.

VISUAL MATERIALS

In general, visual materials for use in the conservation class are ample, but they do not always exist in the form most necessary or desired. Considerable effort on the part of both teacher and class is required, therefore, in order to build up the illustrative work-shop materials needed.

Maps

1. A flexible slated blackboard wall map of the United States procurable from any reliable map-publishing firm such as:

(a) Denoyer-Geppert Company, 5235 Ravenswood Avenue, Chicago, Illinois.

(b) A. J. Nystrom and Company, 3333 Elston Avenue, Chicago, Illinois.

(c) Rand McNally and Company, 536 S. Clarke Street, Chicago, Illinois.

2. Philips C.W.A. maps of the United States showing Rainfall, Natural Vegetation, and Population.
3. A good physical map of the United States.
4. Denoyer-Geppert publishes a map entitled *Conservation in the United States*.

The Agricultural Adjustment Administration publishes a map, *Regionalized Types of Farming in the United States*.

The Department of the Interior publishes large maps showing National Parks, Indian Lands, Growth of the National Area, Petroleum Fields, Irrigated Lands, and so forth.

The Forest Service publishes a map of the National Forests.

5. Textbooks and government reports contain many small useful maps. These can be enlarged to wall-map size by using large base maps procurable from the U. S. Geological Survey or from most map publishers.

Graphs and Charts

1. Soil Conservation Service, *A List of Publications and Conservation Charts*, U. S. Department of Agriculture, Washington, D. C.
2. Textbooks and government reports (particularly those of the National Resources Planning Board) contain many graphs and charts. Where desirable these may be enlarged to wall size.
3. For temporary graphs, Denoyer-Geppert makes a Cartocraft slated flexible blackboard graph base which is exceedingly useful.

Films

1. A minimum selection of 16-mm. films might consist of the following:
 - (a) "Conservation of Our Natural Resources" (1 reel, sound), Erpi Classroom Films, Inc., 35-11 35th Avenue, Long Island City, N. Y. Sale only. \$50 less discount.
 - (b) "The Tree of Life" (2 reels, sound), Department of Agriculture, Division of Motion Pictures, Washington, D. C. Free. Borrower pays transportation both ways.
 - (c) "Save the Soil" (2 reels, silent), Department of Agriculture, Division of Motion Pictures, Washington, D. C. Free. Borrower pays transportation both ways.
 - (d) "The Plow That Broke the Plains" (2½ reels, sound), U. S. Film Service, Washington, D. C. Free. Borrower pays transportation both ways.

- (e) "The River" (3 reels, sound), U. S. Film Service, Washington, D. C. Free. Borrower pays transportation both ways.
- (f) "Challenge of the Slums" (1 reel, silent), Garrison Film Distributors, Inc., 1600 Broadway, New York. Rental \$2 per day.
- (g) "City Planning" (1 reel, sound), Bell and Howell Co., 1801 Larchmont Avenue, Chicago, Ill. Rental, \$1.50 per day.
- 2. RENNER, G. T., and W. H. HARTLEY, *Conservation and Citizenship*, Heath, Boston, 1940. Appendix A contains 150 selected educational films for conservation, arranged by subject.
- 3. HARTLEY, W. H., *Selected Films for American History and Problems*, Bureau of Publications, Teachers College, Columbia University, New York, 1940. Contains an evaluated and classified list of educational films.

Pictures

No books are better illustrated, as a rule, than are textbooks and other publications dealing with conservation. Their pictures are almost invariably chosen because of their power to convey a message. They should be used constantly and taught thoroughly. Additional pictures from various sources may be collected, mounted on cards, and properly captioned with statements or questions for class study.

Small pictures may be used in the reflectoscope, or lantern slides may be made from them. Large and particularly challenging pictures may be framed and hung upon the classroom walls.

SOURCES OF INFORMATION

A Partial List of Conservation Organizations

- 1. American Civic and Planning Association, Union Trust Building, Washington, D. C.
- 2. American Forestry Association, 919—17th St., N.W., Washington, D. C.
- 3. American Institute of Planners (American City Planning Institute) Hunt Hall, Cambridge, Massachusetts.
- 4. American Nature Association, 1214—16th St., N.W., Washington, D. C.
- 5. American Wildlife Institute, Investment Building, Washington, D. C.
- 6. Boy Scouts of America, 2 Park Ave., New York City.
- 7. Camp Fire Girls, Inc., 51 Union Square, New York City.

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8. Educational Conservation Society, 28-12 43rd St., Long Island City, N. Y.
9. Garden Club of America, 598 Madison Ave., New York City.
10. Girl Scouts of America, 14 West 49th St., New York City.
11. Izaak Walton League of America, Merchandise Mart, Chicago.
12. National Association of Audubon Societies, 1006 Fifth Avenue, New York City.
13. National Economic and Social Planning Association, 1721 I St., N.W., Washington, D. C.
14. National Geographic Society, 16th and M Streets, N.W., Washington, D. C.
15. National Parks Association, 1624 H St., N.W., Washington, D. C.
16. National Recreation Association, 315 Fourth Ave., New York City.
17. National Wildlife Federation, Normandy Building, Washington, D. C.
18. Wild Flower Preservation Society, 3740 Oliver St., Washington, D. C.

Government Agencies Principally Concerned with Conservation

1. Executive Office of the President.
 - (a) National Resources Planning Board.
2. Department of Agriculture.
 - (a) Agricultural Adjustment Administration.
 - (b) Bureau of Agricultural Economics.
 - (c) Extension Service.
 - (d) Farm Security Administration.
 - (e) Forest Service.
 - (f) Office of Experiment Stations.
 - (g) Office of Land Use Co-ordination
 - (h) Rural Electrification Administration.
 - (i) Soil Conservation Service.
3. Department of Commerce.
 - (a) Bureau of the Census.
4. Department of the Interior.
 - (a) Bituminous Coal Division.
 - (b) Bureau of Biological Survey.
 - (c) Bureau of Mines.
 - (d) Bureau of Reclamation.
 - (e) Fish and Wildlife Service.
 - (f) Grazing Service.

- (g) General Land Office.
- (h) Geological Survey.
- (i) National Park Service.
- (j) Office of Indian Affairs.
- (k) Petroleum Conservation Division.
- 5. Department of Labor.
 - (a) Children's Bureau.
 - (b) Women's Bureau.
- 6. Department of War.
 - (a) Office of the Chief of Engineers.
- 7. Independent Agencies.
 - (a) Alley Dwelling Authority for the District of Columbia.
 - (b) American National Red Cross.
 - (c) Federal Security Agency.
 - (1) Social Security Board.
 - (2) Public Health Service.
 - (3) U. S. Office of Education.
 - (4) National Youth Administration.
 - (5) Civilian Conservation Corps.
 - (d) Federal Works Agency.
 - (1) Work Projects Administration.
 - (2) U. S. Housing Authority.
 - (e) National Capital Park and Planning Commission.
 - (f) Tennessee Valley Authority.

A Partial List of Magazines Dealing with Conservation

- 1. *American Forests*, The American Forestry Association, Washington, D. C.
- 2. *American Wildlife*, American Wildlife Institute, Washington, D. C.
- 3. *Bird Lore*, National Association of Audubon Societies, New York.
- 4. *Conservation*, The American Forestry Association, Washington, D. C.
- 5. *Journal of Forestry*, Society of American Foresters, Washington, D. C.
- 6. *Journal of Geography*, National Council of Geography Teachers, Mankato, Minnesota.
- 7. *Land Policy Review*, Bureau of Agricultural Economics, Government Printing Office, Washington, D. C.
- 8. *Nature Magazine*, American Nature Association, Washington, D. C.

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9. *Outdoor America*, Izaak Walton League of America, Chicago.
10. *Park Service Bulletin*, U. S. Department of the Interior, Washington, D. C.
11. *Reclamation Era*, Government Printing Office, Washington, D. C.
12. *Soil Conservation*, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C.

THE TEACHER'S FORUM

1. Should we have general or national textbooks in conservation, or should such books be state or regional in scope? What are the advantages or disadvantages of each?

2. Can we have effective conservation education without some far-reaching changes in the basic courses in science and social studies? What specifically is needed?

3. What are the possibilities of *making* materials which are needed for the conservation class by having the art class draw posters, cartoons and sketches, and collect and mount pictures; by having the geography class enlarge small maps to wall size; and by having the mathematics class construct wall graphs?

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- HYNNING, C. J., *State Conservation of Resources*, National Resources Committee, Government Printing Office, Washington, D. C., 1939, Appendices A, B, and D.
- QUAINTANCE, C. W., "Should We Have National Textbooks on Conservation Teaching?", *School Science and Mathematics*, October, 1938, pp. 789-795.

CHAPTER XX

MATERIALS IN THE LOCAL AREA

In the teaching of most school "subjects," the local area is a much-neglected source of educational material. In large part, this is the result of the prevalent classical ideas about education. There is nothing wrong with such ideas except that they are fundamentally monastic rather than social and for the most part run counter to the basic psychological principles of how learning is initiated and sustained.

THREE PHILOSOPHIES OF EDUCATION

The academic philosophy of education which arose from these classical ideas implies that the function of the school is to select learning materials in such manner as to permit an essentially complete experience in each of the logical approaches to knowledge (the so-called school subjects). It further implies that the school must bring these materials to the child, encourage the child to react to them in such manner as to produce learning outcomes, and then send him out into the community with personal resources for rationalization.

The new activist or "progressive" philosophy of education is aimed at making the school an actual part of the community complex which extends over the local area. It envisions an educational situation wherein there is no break between school and adult community life.

We are, of course, a long way from being able to discard the former and realize the latter. We might well, therefore, exploit a third possibility, namely, the functionalist philosophy of education.

The central idea in such a philosophy is that nothing is worth teaching unless it produces socially useful results. Certainly it cannot be seriously asserted that any subject is worth teaching primarily for its own sake. And yet this almost axiomatic truth has had little attention accorded it, either with respect to what is taught or as to how learning is directed. As one social science teacher recently remarked: "We have taught history in my community for nearly one hundred years, geography for more than seventy years, and civics for forty years; and yet the human geography of my community grows steadily worse, the government becomes more corrupt, and no one has ever

thought of profiting from the lessons of history." Obviously this is not *functional* education, regardless of what may be our motives in teaching these social sciences.

LOCAL FUNCTIONAL EDUCATION

Part of the reason for the lack of functionalism in education is that the materials used for instructional purposes are not drawn from the local environment and that there has been no attempt to express the learning outcomes in terms of the local area and its social scene. To do both these things is not enough, however. It is even more necessary that the teacher be able to lead his students to the point where they can see the faults in the local community and can suggest actual remedies and changes of major importance. Where these things are done it may be truly said that the community and its local resource base are the school textbook—or perhaps it might be more properly said, the source book and laboratory, the locus of all school learning.

From the standpoint of education, the local environment contains these elements or materials for study:

1. The resource base.
 - (a) Locational and spatial resources.
 - (b) Physical resources (soils, climates, rocks and minerals, physical relief features, etc.).
 - (c) Biotic resources (fauna and flora).
 - (d) Esthetic resources (scenery, outlook view, natural beauty, etc.).
2. The human resources.
 - (a) Population numbers.
 - (b) Racial groups.
 - (c) Talents, abilities, educational advantages, historical backgrounds, etc.
3. Ecological (human geographic) utilizations.
 - (a) Physical pattern and layout of the community.
 - (b) Economic, social, and political practices and institutions.
 - (c) Unutilized resources.
 - (d) Misused resources and forms of wastage and destruction.
 - (e) Esthetic quality of the community.
 - (f) Public opinions, attitudes, and biases.
 - (g) Advantages and disadvantages for human living.
4. Possibilities of local planned improvement.

All this suggests that the entire subject of conservation can be taught from the materials of the local area. This, however, is true neither in fact nor in theory. It would be true save that communities do not live unto themselves; a small local area is always part of a larger economy and therefore depends upon the exploitation of many kinds of natural resources which it does not itself contain. For example, the community of Everett, Washington, is vitally concerned with the erosion of Palouse wheatland, the depletion of range grassland in the John Day Country, and the waste of Bakersfield petroleum; but even the most thoroughgoing study of the local environment will not provide any contact with samples of such problems. Everett faces its own local problems of forest, water, fish and game, scenic and recreational resources, and town planning, and these should be fully utilized educationally, but the matter cannot end there. The educational program must go beyond these limits and present the outline of the whole resource base upon which the community depends. Obviously part of this program must rely upon textual and visual-aid materials rather than local observable situations.

This same situation appears in exaggerated form to the metropolitan teacher. A large urban community such as New York exploits only a limited number of the elements in its own immediate natural environment. It lives by bringing in for processing and trade the products from a vast hinterland. It does this without paying any attention to the far-away resources which are being exploited to provide the continuous stream of products. The problems of conservation existing in the distant areas where these products originate are vital to the New York child but they lack reality for him because they are both invisible and physically inaccessible. At the very outset, therefore, it must be recognized that the conservation problems of any locality are far broader than the local area. Indeed, the principles and major outlines of conservation are national, or at least regional, and their extra-local aspects can be made real and challenging only when ideas about them are carefully developed in terms of the use and misuse of resources in the immediate local environment.

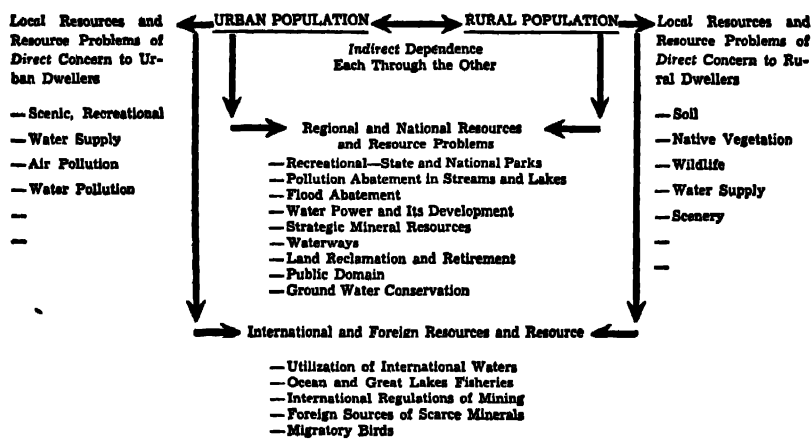
RURAL VERSUS URBAN AREAS

To make the challenges of conservation emerge from the local scene and become real to the student is perhaps the primary problem in conservation education. Important secondary problems are: (1) finding representative types of specific resources, (2) identifying important forms of resource waste, (3) locating significant examples of

remedial action, and (4) finding specific illustrations for the various points raised in class discussion.

Considerable difference exists between urban and rural areas as loci for teaching. It is often assumed that the city is a much poorer place in which to teach conservation than is the country community. It is doubtful, however, whether the city actually is a less fertile field than the country. They do differ, however, in the major classes of resources being exploited and the type of problems which are in evidence.

In the rural area the natural landscape preponderates over the cultural landscape, and man's occupation is based primarily upon the



Courtesy of J. R. Whitaker and the Peabody Journal of Education.

Fig. 53. Diagram showing place relations in conservation.

utilization of soil, water, trees, grass, fish and other wildlife, and scenery. The problems of conservation, therefore, turn upon these things. (See Fig. 53.) In the urban area the man-made landscape dominates and sometimes tends to obscure the natural pattern. Urban man finds his immediate conservation problems centering about the use of locational values and advantages, local topography, scenic and recreational resources; about water supply, water pollution, and air pollution; about the resources of space, community pattern and design; about human resources. (See Fig. 53.)

When these two sets of resources are added together, they do not, even then, constitute the entire picture. As J. R. Whitaker has pointed out, there are many additional resources, such as water power and minerals, which are regional or even national in the incidence of their

problems. Still others, such as migratory fishes and birds and marine fisheries, are international in their significance. (See Fig. 53.)

It is therefore far from correct to say that the city is poorer than the country in conservation education materials, or vice versa; the two are simply different. In many respects, the small village is richer than either, because it usually contains both urban and rural elements awaiting educational utilization.

The first consideration of the teacher, whether rural, village, or urban, is to lay out his program in such manner as to utilize the materials which are particularly significant in his own community. After these have been thoroughly exploited educationally, those resources and problems which are not characteristic of the local area but pertain to the larger region may be explored. Learning about these can be based upon analogy, and its effectiveness strengthened by the use of well-chosen descriptions and visual aids. Finally, those resources which are national or international in their significance should be considered. If local resources are studied first, then regional resources, and finally those whose problems are of widest incidence, learning is facilitated by the natural process of progressing from the immediate and familiar to the remote and less familiar.

THE RURAL AREA

In the country or village school, the program starts rather effortlessly with a study of the soil—its composition, origin, fertility, economic role, and relation to water and vegetative cover, its conservation problems and their remedies. Ground water, surface waters, timber, rocks and minerals, follow easily. Trees of many kinds can be identified and examined. Wildlife can readily be located and its habits and problems studied. Examples of the waste of minerals and pollution of water and of the problems of housing, community design, and neglected human resources are usually relatively unimportant in country districts and hence difficult to find, but even the most meager examples can be ferreted out and utilized as fully as possible. These small local evidences can be used as the basis for leading the rural child to appreciate that many of these, in exaggerated form, constitute the major problems of city areas, in contrast to his own rural problems of soil, forest, grassland, and wildlife. All the way along, there is ample opportunity for the pupil to see the basic resources, the significance of their use to the life of the community, and the implications of their faulty exploitation.

THE URBAN AREA

In the city, the conservation program may conceivably be initiated in quite a different manner. A traffic count by members of the class can lead to a study of the street pattern, and this in turn will reveal a remarkable misuse of the resource of community design. Studies of density of population, congestion, and bad housing will lead further into the large question of the misuse of the natural resource of space.

Soon, the whole problem of the wholesale sacrifice of human resources for immediate commercial advantage becomes apparent. From that point on, the class should readily uncover the ruthless misuse and waste of all resources which lie below the seeming health and vigor of the city. The pollution of waters, the misuse of water front, the high cost of water supply, the evils of present sewage-disposal methods are there for class discovery. The pollution of the air, the lack of adequate sunlight and contact with the land and nature, the increasing divorce of the city from the country, and the impoverishment of the work and play experiences of the city child gradually become evident. The despoliation of surface resources at the outskirts of the city and the retreat of suburban agriculture before the pressure of urban land speculation and the depredations of city people may next be studied. Finally, the class is ready to turn its attention to the tremendous drain which the great city populations are making upon the soils, forests, minerals, and human resources of remote regions—a drain which at present is only very partially repaid. It is not quite accurate to say, as did one Iowa citizen, that, for all these resources, "the city gives back only books and newspapers, styles, traveling salesmen, and a few gadgets of machinery"; but it is true that the exchange of resources and products has hitherto not been a balanced one, as it must be if national permanence is to be assured.

City peoples depend for their livelihood largely upon manufactural and commercial activities. As J. R. Whitaker remarks, they are not, therefore, "in a position to see the results of the exploitation of soils, ore bodies, and forests to meet their needs. They are ordinarily removed by miles from the sources of raw materials on which their lives depend, and that distance has lengthened with the depletion of the nearer resources and the improvement of transportation."¹

Nevertheless the city teacher may illustrate even these resources by local examples and thereby make them real for the class. Excavations

¹ J. R. Whitaker, "Place Relations in Conservation Education," *Peabody Journal of Education*, Vol. 18, No. 4, January, 1941, p. 209.

for buildings may expose the subsoil and bedrock and make it available for study. Soil on a vacant lot may be dug into and examined. A small stream, lake, or waterfall may be found in the park. A rain may illustrate gullying in the school yard or on the parking strip, and small alluvial fans and deltas may be deposited in the gutter or on the sidewalk. A heavy rain may wash debris through the street, providing miniature evidence of the destructiveness of a flood. Few indeed are the city neighborhoods which do not harbor birds, squirrels, and other forms of wildlife, or where trees, grass, weeds, and flowers do not manage to survive however meagerly.

In addition to these small first-hand contacts with the nature, "city dwellers have," as Whitaker points out, "the opportunity to see the results, good and bad, of what they do. The visit of the family to the park may leave it littered with rubbish or clean and attractive. [See Fig. 42.] Small plots in the fence corners, trees in the back yard, berry patches in the school garden, these all provide occasion [in all but the largest cities] for scenic and wildlife conservation. From the proper disposal of a lollypop wrapper to the relocation of a highway in order to restore a river bank, there is ample opportunity for participation in local conservation."²

OTHER EDUCATIONAL RESOURCES

All this serves to emphasize the important fact that the problems and remedial answers in conservation become real and take on substance only when they rest upon an adequate knowledge of, and contact with, basic natural resources. To accomplish this demands the whole-hearted participation by those who teach elementary science and the social studies. It also demands motivated excursions, school-yard lessons, and field studies in order to provide the challenges and interests needed to carry the class over into the use of printed book materials. Obviously, a large program of out-of-school activity should be planned in order to achieve some measure of continuity between school and community.

Personalities.

Probably every community in America contains one or more persons who are important educational resources. A local farmer, fisherman, miner, rancher, or engineer may be interviewed and ideas on the meaning of conservation obtained. Even a large city contains many

²*Ibid.*

retired farmers, ranchers, and mine superintendents who may be well informed on some phase of the subject. The lumber dealer or fish merchant can give information on varieties and species, on present prices as compared with those of ten or twenty years ago.

If a geologist, mining engineer, naturalist, geographer, or sociologist is resident in the community, his help can usually be enlisted on definitely scheduled problems or projects. The local county agent, game warden, or sanitary engineer can be of considerable help. Many old inhabitants of the community can furnish accounts of animals, birds, flowers, and trees which once were abundant but have now vanished. Persons who have traveled through "problem areas" in other parts of the United States or have visited important reclamation or flood-control projects often will be glad to recount their observations.

Persons in charge of local relief work, the re-employment service, or a nearby Civilian Conservation Corps camp may be willing to discuss the human problems of the community. A lawyer, a public-health nurse, or a chief of police may be able to provide information on poor housing, public health, crime, and moral delinquency. Live-stock breeders, horticulturists, or biologists can discuss the facts about the rearing of plants and animals and the bearing of the facts upon human eugenics.

Your local area may have a planning board, a zoning commission, or various service clubs. From them you can obtain information about the plans which are, or are not, being made for your community.

Points of Interest

Most localities contain one or more points of interest which may be turned to educational account. An old water mill, a fish hatchery, a sewage-disposal plant, water works, power plant, irrigation or drainage ditch, reservoir, or flood-control works will be well worth studying. A mine, a clay pit, a spring, or a marsh are fertile loci for teaching. Local museums, public exhibits, and private collections often yield desired learning situations.

Other Sources

The radio has for several years presented housing, conservation, planning, and historical programs of considerable value. Some of these are given by federal and state agencies, others by private national and local organizations. Radio speeches often contain valuable and challenging references to the use of resources. Books, magazine and newspaper articles, pictures, and cartoons supply a new and constantly growing stream of conservation materials.

NO LOCAL MATERIALS

John Caldwell, of Nashville, Tennessee, tells of asking a country school teacher whether or not she taught conservation to her pupils. Apologetically she replied in the negative, saying she "did not have any materials." And so Caldwell got out his camera and took a pic-



Courtesy of the State of Tennessee Department of Conservation.

FIG. 54. The school grounds of a rural school which had "no materials for the teaching of conservation."

ture of the school. It shows a good rural school building whose very foundations are being threatened by two large and vigorous gullies. Indeed, the whole school yard is a veritable laboratory for the study of land denudation and soil erosion. (See Fig. 54.)

Richard Tuthill recounts a somewhat similar story about a New York City teacher who affirmed her strong belief in conservation education, but complained that the teacher in a big city has nothing with which to illustrate or motivate conservation. And yet within a few blocks of her school there were the horribly polluted waters of the Hudson, a filthy area of slums, half a hundred fine gullies on the side of a railroad cut, a small patch of park wherein a few dejected trees

were struggling to live, and hundreds of pieces of evidence of the lack of city planning and wasted human resources.

Examples such as these merely reinforce the fact that the local area as a source of the real materials for education is usually neglected or even ignored altogether.

THE TEACHER'S FORUM

1. Do all communities offer some local situation or situations which can be utilized as an avenue of approach to the study of conservation? Why? What does your community contain? What does it lack?

2. Is it easier to teach conservation in a rural or urban community? Defend your position.

3. What kind of training do you think teachers should have to enable them to utilize the educational resources of their community?

4. What factors in your community operate to prevent or reduce class study outside the school building? What factors encourage it?

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CHAPTER XXI

ORGANIZING A UNIT OF STUDY

In general, subject matter may be organized for class use in one of two ways: (1) as a chapter or sequential segment in a continuous developmental treatment of a large subject or area of knowledge, or (2) as a natural experience "unit" which is more or less complete within itself but constitutes a topical episode or step in a larger sequence of learning. The latter has generally found favor in the eyes of the functionalists and progressivists in education, because it is a more or less "natural" division of subject matter in contrast to the logical and sequential divisions traditionally employed by the academic school.

THE UNIT DEFINED

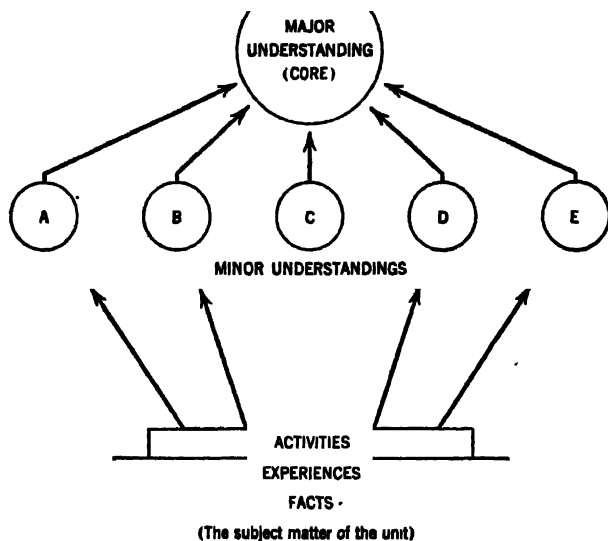
A teaching unit is a selected body of subject matter organized around a definite core of thought, central understanding, or major experience, and delineated by specific directions for study, teaching, and class activity. The unifying element or core must be a large and basic idea. At the very outset this implies that the major understanding of a unit must be a central *abstract* idea resting upon very many minor understandings of semiabstract character. These in turn are derived from a large body of concrete non-abstract facts, experiences, and activities. Diagrammatically this might be shown as indicated in Fig. 55.

As an example of a "natural" unit of subject matter, *Conservation of Forest Resources* could be cited. The major understanding toward which it would be directed might be: The forest is a basic natural resource which is being rapidly depleted, but which can, with proper care, be restored to permanent adequacy. This central idea is derived from a dozen or more semiabstract ideas or minor understandings such as: (1) under proper management, forest land will restock itself with timber, (2) devastated land can be reclaimed and replanted, and (3) there is a close relationship between forest cover and ground-water level. These, in turn, rest upon and emerge out of a vast number of facts about trees, soil, water, climate, wildlife, insect pests, fire, ero-

sion, and the actions and needs of men, which must constitute the *content* of the unit.

SUBJECT MATTER AND TOPICS FOR UNITS

The choice of suitable unit topics and the selection of satisfactory subject matter content for them are not difficult or remote problems.



(The subject matter of the unit)

Drawn by G. T. Renner.

FIG. 55. Diagram of the structure of a teaching unit.

Instead they throw one sharply into the current scene of social and civic affairs. The droughts, floods, stranded industrial communities, and widespread economic difficulties of the last few decades have caused the more thoughtful people in every part of the country to consider how we may improve our use of resources in the future so as to avoid repeating and even increasing such disasters. The school pupil can and must be taught to view these problems in both their local and country-wide aspects. Droughts, floods, soil erosion, land exhaustion, distressed tenant farming, overproduction of certain crops, forest fires, streams reeking with filth, polluted beaches, infringement of game laws, questions of raw-material scarcity, industrial waste, child labor, closing of rural schools, blighted areas in cities and villages, increasing traffic dangers and difficulties—all of these are con-

servation problems which may be found in practically every magazine and newspaper.

By the same token, Boulder Dam, the Great Lakes-to-Gulf Waterway, the Soil Conservation Service, the Tennessee Valley Authority, the State Planning Board of your state, the National Resources Planning Board, various flood-control plans and organizations such as the Miami Conservancy District, the Civilian Conservation Corps, the crop-control programs of the Agricultural Adjustment Administration, the Izaak Walton League, the Audubon Society, the National Shelterbelt Project, the submarginal land purchase programs, and many others are attempted conservation solutions which likewise from time to time bulk large in current literature.

The teacher will experience no dearth of material for conservation teaching. Indeed, it is so plentiful that the main task will consist of sorting out what is most pertinent and illuminating. Other than this, the teacher should see that the material is fresh and new, is actually challenging to the student, is capable of being organized, and can be translated into terms of reality in the student's experience.

The general realm of resources is commonly divided into some ten categories—land, water, forest, range, minerals, wild plant life, fisheries, wild animal life, recreational assets, and human resources. Each of these ten may form the basis of a unit of study, depending, of course, upon material available, community needs, and teacher or class interests. Or, again, a unit may be based upon the Nature of Conservation, the History of Conservation Movement, or it may deal with Losses and Savings in Manufacturing, or Waste in Unplanned Villages and Cities, or with one of many other possible topics.

WAYS OF APPROACHING THE UNIT

Insofar as possible the pupil should be given the idea that conservation is not a matter detached from every-day reality. The local situation is always at hand rich in challenges and examples. The writer knows of no community without some striking example or examples of wasteful exploitation or of maladjustment to resources. Probably, too, no community is without its example of commendable resource development and conservational measures. All city schools have at hand factories, slums and blighted areas, congested business districts, areas in which all beauty has been destroyed, traffic dangers, misfit land uses, and usually both polluted waters and areas necessary for public recreation but selfishly appropriated by private interests. All rural schools have access to examples of soil erosion, timber or grass-

land depletion, poor land use, underprivileged families, poorly organized community facilities and activities, and lack of provision for native wildlife. Usually, too, they will have access to mines, sawmills, fish hatcheries, dams, forests, and game preserves. In the process of teaching the unit, the entire situation may be inventoried and used as a tangible point of departure. This may well be supplemented by class or special group visits to selected spots.

VARIOUS PATTERNS FOR UNITS

There is no rigid or standard formula for laying out a unit of study in conservation. Procedure, content, and format vary widely because of differences in teachers, pupils, and local educational practices. Several formats are here presented in order to illustrate different types of units now in use.

Marguerite Logan submits a short outline unit with three major headings:

Topic

1. Preview, motivation, and presentation of disconcerting data.
2. Assimilation.
3. Overview and summary.

J. Wright Baylor employs the following plan in setting up a series of problem-project units:

Topic

1. Essential facts and summarizations.
2. Questions and topics for discussion.
3. Objective tests.
4. Suggested projects and exercises.

Anne Raymond, in constructing a beginner's unit on land and water conservation, has evolved the following outline:

Topic

1. Specific objectives.
2. Learning situations for parallel work in social studies, language, reading, writing, spelling, art (see Fig. 56), and natural science.
3. Class bibliography.
4. Activities.
5. Final statement.

W. H. Hartley in preparing an exploratory unit on conservation uses the following structural outline:

Topic

1. Introductory statement.
2. Specific objectives.
3. Overview.
4. Generalizations.
5. Approaches to the unit.
6. Content for the teacher.
7. Suggested unit activities.
8. Audio-visual materials.
9. Bibliography.

W. H. Bristow and K. M. Cook suggest the following pattern for a unit:

Topic

1. Problem.
2. Controlling theme.
3. Overview.
4. Suggested approaches.
5. Content for major problems.
6. Culminating activities.
7. Evaluation.
8. References for major problems.
9. Teacher's bibliography.
10. Pupil's bibliography.

Harriet Carter presents an outline of a high-school unit on soil conservation which is essentially as follows:

Saving Our Soils

1. Purposes of our study.
2. Challenging facts.
3. Soil erosion in the school locality.
4. Soil erosion in the United States.
 - (a) Areas badly eroded.
 - (b) Rate of erosion.
 - (c) Effects of erosion.
5. Land treatment to save soil and water.
6. Agencies at work saving our soils.
7. Suggestions for individual and group study of the effects of erosion and the remedies, together with activities and projects.
8. Suggestions for additional follow-up work.
9. Sources for pictures.

10. Bibliography.

11. Sources of information and their addresses.

Dorothy Herbert, in designing a senior high-school unit on human resources, deviates from the general pattern somewhat:

Understanding Human Resources

1. Overview.

2. Assimilation—study of six major topics:

(a) The money value of an individual.

(1) Conversational approach.

(2) Read to find answers to five specific problems—using prescribed sources.

(3) Panel discussion.

(4) Graphic summary.

(b) Guarding personal and public health.

(1) Conversational approach.

(2) Read to find answers to five specific problems—using prescribed sources.

(3) Panel discussion.

(4) Show four prescribed films on disease and accident.

(5) General activities.

(c) Population trend and its implications.

(1) Conversational approach.

(2) Study of the five trends and listing of the educational implications—using the N.E.A. Research Bulletin for January 15, 1938, or some comparable source.

(3) Panel discussion of sixteen specific problems.

(4) General activities.

(d) Tenant farmers and their plight.

(1) Conversational approach.

(2) Answer three broad questions from stated sources.

(3) Panel discussion.

(4) Preparation of wall charts and graphs.

(5) General activities—a drama.

(e) Housing.

(1) Conversational approach.

(2) Answer five specific questions from stated sources.

(3) Panel discussion of eight topics.

(4) General activities.

(f) Social security.

(1) Conversational approach.

- (2) Reading prescribed materials to answer six specific questions.
- (3) Panel discussion of ten topics.
- (4) General activities.
3. Final synthesis.
4. Testing and evaluating.
5. Bibliography for the class.

SETTING UP THE UNIT

Despite considerable variation in final pattern and format, the task of preparing a unit, so far as the work of the teacher is concerned, consists essentially of some eight steps, as follows:

1. *Local exploration*

The first step should be a preliminary exploration by the teacher of community needs, local challenges and resources, and the preparation of an inventory list of these items for future use.

2. *Naming the unit*

The second step consists of evaluating the situation at hand and deciding upon the general scope and title of a first unit.

3. *Gathering and selecting materials*

The next step involves making a bibliography of essential references. These references should be assembled and made available to the students. In addition, the teacher may find it necessary to abstract certain materials from scattered or generally unavailable sources and have them mimeographed, or even to write certain items himself.

4. *Preparation of an overview*

This will serve the purposes of introduction and orientation. It is necessary that the teacher be familiar with the material in order to present it effectively and challengingly.

5. *Making of generalizations*

Many striking generalizations are possible. For example, "The United States has already destroyed more soil than the entire Japanese nation has for its agriculture." "Every year we waste as much coal as we use," etc., etc. Part of such generalizations should be provided by the teacher, but others should be contributed by the pupils.

6. *Setting up general aims and specified objectives.*

The teacher should formulate a definite set of aims and objectives. These will naturally vary in number and character but one of the most important must be, as stated by William H. Hartley, "To introduce the problems of conservation in such a fashion as to challenge the student and instill in him a desire to participate actively in their solution."

7. *Working out a teaching approach*

The subject of conservation can be handled in several ways. If possible, a field trip should be planned. This may afford an opportunity to observe polluted streams, ore piles, culm banks, cut-over timber, a flood, piles of scrap iron, soil erosion, or other evidences of need for conservation. Or a class discussion of America's resources and their relation to human needs and to our standard of living may be carried on. Or, again, a talk by the county farm agent, a city planner, a member of the Soil Conservation Service, an officer of the Civilian Conservation Corps, or some other competent person may serve to introduce the general problem. A newspaper or magazine article, a radio speech, or a local catastrophe may also provide an opening wedge.

In the work which follows, it will usually be impossible to deal solely with conservation. It will be necessary to go into the processes of cultivating, mining, or manufacturing many products, as well as to consider their nature, uses, and geographic relationships. The extent to which such background material and related understandings can be developed will depend obviously upon the time available. All the way through, teaching will probably be most effective if the instructor permits the pupils to formulate their own opinions on the basis of the evidence at hand.

8. *Constructing a program of culminating activities*

Some of the culminating activities should be suitable for individuals, some for committees or groups, and some for the class as a whole. They may involve dramatization, exhibits, excursions, visits to museums, making of maps, diagrams, charts, or scrap books, or the construction of models or lantern slides, and so forth.

Conservation is a vital and lively subject, and its challenges are real and insistent. The opportunity to induce the future citizen to explore the problems of conservation is not only attractive but also exciting. Here is no formal topic requiring studied devices for moti-

vation and interest stimulation but a set of problems which are provocative of interest and well-nigh self-motivating. The United States is ours to destroy or conserve; there is something each citizen can do about the matter.

THE TEACHER'S FORUM

1. What are the advantages of the unit form of subject-matter organization? What are the disadvantages? Which preponderate?

2. Does conservation lend itself readily to unit organization and teaching? Why? To teaching by the problem method? By the project or activity method?

3. Many educators today hold that the curriculum should consist primarily of units of work and experience built around challenges and situations in the child's local environment. John Dewey partially endorses this idea when he writes: "They should be utilized. But there is a decided difference between using them in the development of a continuing line of activity, and trusting them to provide the chief material of learning. . . . The basic materials cannot be picked up in cursory manner."¹ Does this constitute any criticism of the usual program of unit studies found in many schools? What changes are needed?

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¹ J. Dewey, *Experience and Education*, Macmillan, New York, 1938, p. 96.

CHAPTER XXII

NEXT STEPS IN EDUCATION

The case for conservation perhaps needs to be restated at this point. Such a restatement can best be made in the form of the following six simple propositions:

1. Civilization rests upon our institutions.
2. Institutions are supported by natural resources and exist only because of the ceaseless exploitation and utilization of those resources.
3. Natural resources for the most part are perishable, destructible, and depletable.
4. If we exhaust or destroy our resources, the institutions which they support will collapse and civilization will decline.
5. Our civilization will never perish because we trade democracy off for communism, fascism, theocracy, or monarchy; but it will perish if we use up our minerals, ruin our soil, and otherwise deplete our natural resources.
6. We have already done this to a surprising degree. After a mere 150 years of national existence, we have run through a large percentage of our original store of geographical equipment. Even at the rate we are now going, to say nothing of future increases, we can already see the end of a prosperous national existence. Our resources are already wearing thin in spots.

THE PROBLEM RESTATED

The remedial measures as they have been presented in the preceding chapters, collectively make up a wide and varied program. This total program involves physical planning and management for some resources, socio-economic planning for other kinds of resources, and national ownership and socialized control for still others. In all cases, it demands the eventual development of local, state, regional, and national planning and conservation management by the American people. We are indeed at the end of an era. This does not mean that freedom and opportunity are ended, but it does mean that the sooner we close the present period of economic irresponsibility the

better for us and for future generations of Americans. To do this, we do not in the least have to surrender our democracy. Conservation can be achieved under totalitarianism, but it can also be achieved under democracy. The democratic method is always the hardest way of accomplishing any necessary objective; but no nation ever adopted democracy because it offered the easiest solution to the general problem of social control. In order to accomplish resource conservation we must make conservation planning a fourth arm of our democratic government. At present, our system of government functions through three independent arms, legislative, judicial, and executive. To this we must add a conservation-planning arm. In our future American democracy every municipality should possess a Mayor or Manager, a City Council, a Municipal Court, and a Conservation Planning Board actively supported and participated in by the citizenry. Each state should likewise provide for this co-ordinate function. At the other end of the scale, a National Conservation Planning Board should share importance and relative independence of action with the President, the Congress, and the Supreme Court.

CONSERVATION IN A DEMOCRACY

This should not mean the destruction of democracy. It implies, on the contrary, its actual expansion. However, it does imply the end of economic and geographic irresponsibility on the part of our democracy. A tremendous change—yes; but the alternative is geographic ruin, continued economic instability, and eventual social decline.

If we are to achieve this desirable condition the need for it must become speedily and generally known. It is a characteristic of democracy that no large actions are undertaken until the need for them reaches almost overwhelming size and seriousness. Resource depletion in America has not yet become a catastrophe. It were wise that we do not postpone action until the day when it shall have swelled to such magnitude. If we should wait, there does not seem to be any unforeseen factor which can happily intervene at that late date and save us from the results of our foolish unconcern.

Before action can be expected, however, we must have developed improved individual attitudes and aims on the part of our entire citizenry. Very likely, the American must be given a social philosophy entirely different from the one he now possesses. This is patently a task which can be accomplished only by our educational system, and even our schools cannot accomplish that unless they are thoroughly organized to undertake it. This obviously raises the question of the

purpose of education in a democracy. At present there is considerable confusion on this point; all sorts of answers are being given—for the most part by people who know very little about education.

WHAT IS EDUCATION FOR?

In recent years American education has often been criticized for not being an instrument of indoctrination serving to perpetuate certain traditional values, attitudes, systems of thinking and believing. This raises a very fundamental issue, one which shapes up into the question, Is the highest function of public education in a democracy, that of handing down to the child a lot of sacred heritages from the past, either religious or secular; or is it to teach him to avail himself of the unique privilege of investigating ways for safeguarding the foundations of our future civilization; and to teach him to build deliberately a new society completely divorced from the old traditional ways of thinking and doing?

This is merely one more example of how unreal is the concept of education in the minds of many leaders, American as well as European. But whatever be reality in this issue, we should be slow to accept any traditionalist goals for democratic education and be predisposed to lend ear to the challenges present in our current American situation. Even at best, American education now spends an astonishing amount of its time and energy on the problem of fitting the child to live in society, but it rarely gives a thought to making society fit for the child to live in. Nor does it accord much attention to what kind of world we are permitting to develop, nor to how we are treating the physical foundations of that world. Our educational system is preoccupied with individual tutelage rather than with social engineering—a natural result of emphasizing the psychological viewpoint and neglecting the ecological viewpoint in education. The result has been a finer and finer process of adjusting the individual to a society which is rolling toward collapse through sheer waste and resource depletion. To a very large degree this is turning our educational backs upon reality. It is time that we face about and reorient education toward the process of engineering a permanent and enduring society. Foremost among the problems requiring immediate attention and frontal attack is the waste of our natural resources—our physical and biotic wealth.

The two immediate objectives of conservation have been stated as legislation and education, but there are manifest difficulties in the path of either. With regard to the former, there is real danger that conservation may be made a partisan issue and either bog down in log-

rolling and lobbying or that it will be victimized by party altercation. There is also danger that conservation programs may be pushed ahead too rapidly without proper scientific research and public planning and be unsupported by adequate public knowledge of what is being done or why.

It is true that the public is becoming aware of the general problem but so far there is an almost universal failure to recognize the complexity of that problem. Most people approve the general idea of conservation but, as A. W. Atwood has pointed out:

Where an idea takes hold with such great rapidity and huge funds are devoted to its promotion, excessive claims are sure to be made in its behalf. These together with the almost certain accompaniment of waste and extravagance, spell disappointment and disillusionment later on.

There is a saying among the more level headed Government scientists that it takes ten years from the early stages of an idea before sound law can be enacted. It took years to level off the reclamation idea to anything resembling a sensible basis, and it will take years to level off the soil conservation idea.¹

This may or may not be a fair statement of this particular matter but it contains enough general truth to suggest that, even though we are facing a national emergency, the major outline of the conservation program for many years to come should be educational rather than legislative.

THE EDUCATIONAL APPROACH

Universities and colleges have, for a number of years, offered courses presenting the problems of conservation and telling teachers they should do something about the matter in the schools, but there the program has ended. America has a million teachers, in many thousands of schools, at work under different training and pursuing very unlike programs toward unlike objectives. They all need advice and guidance if their efforts are to be directed toward the necessary ends. If they are to be at all effective, they must know what to do and be trained in ways of doing it. There is no single set of directions or blanket advice which can be issued to American teachers. Obviously, the matter needs to be approached at several points in our educational system.

One of the first points of approach is the policy-making agencies in American education. Fortunately, such agencies are beginning to

¹ A. W. Atwood, "Is This Conservation," *Saturday Evening Post*, September 26, 1936, p. 96.

realize the need. In a recent bulletin, *Education and the National Defense*, the American Council on Education pointed out that the special role of the schools in the national defense program is to insure:

1. The intelligent conservation and utilization of the nation's resources, both human and natural.
2. The development of the health and physical status of the people at the highest possible level.
3. The development through education of the native capacity of the population for individual and social well-being to the highest possible level of effectiveness.

This is a praiseworthy beginning but recognition needs to become more general and include administrators and teachers in all educational patterns. As Paul R. Hanna says: "The task of developing an enlightened public opinion concerning our resources can be done only with the full co-operation of those agencies who are experts in basic knowledge. The school and college people must rally these experts to a new co-operative attack on our mutual problem."²

A second point of approach is those experts who write textbooks, those foundations which foster and finance educational research, and those institutions which sponsor demonstration schools and carry on teacher-training programs.

A third point of approach is those agencies which determine the school curriculum and make the course of study. It is also those institutions which are carrying on experimental curriculum making and revision and sponsoring curriculum workshops and conducting educational institutes.

NEEDED CURRICULUM CHANGES

The school curriculum is in substance a series of guided experiences, so related to one another as to encourage continuity of child growth. Theoretically the curriculum should meet three basic standards:

1. It should be adapted to the capacity of the child, and it should utilize the vitality, initiative, constructive talents, and social interests of the learner.
2. It should be based upon and draw from the life of the local community.
3. It should be aimed and directed at the future welfare of society.

² P. R. Hanna, a communication addressed to the Rockefeller Foundation, October 21, 1940.

We maintain the school as an organized institution whose function is to induct our young into our way of life, to introduce them to our problems, and to prepare them to make contributions to society. So conceived, the school curriculum should make it possible for the child to learn meanings, to gain insights into, and understandings of, our society and culture. It should, therefore, provide opportunities for participation in discussions, surveys, and the process of planning remedial actions. The child in school can and should be led to find problems, consider evidence, and make judgments; to be articulate about his beliefs, to take a stand after due deliberation, and not be neutral or avoid a feeling of responsibility; to respect and listen to minority rights and to submerge his own interests in the larger social good.

To be able to do this the child must know, insofar as his maturity permits, our historical record, our physical resources, our geographic relationships, and our institutional organization. Children, to learn these things, must go through an organized process of facing problems, building a social viewpoint, devising solutions, and evaluating their own solutions. Since we have accepted training for citizenship as one of the major goals of education, particularly at the secondary and tertiary levels, then the school is obligated to provide abundant experiences for learning to live and behave as a citizen of community, state, and nation. The American school is a direct product of democracy but it has rarely operated democratically, nor has it concerned itself with making reciprocal contributions to the functional well-being of democratic society. In order to accomplish this the school is obligated to provide for the child's growth in understanding problems and for his experience in formulating policies and remedial measures.

The curriculum of tomorrow must be set up in terms of the needs of the child as well as those of society. It should include a large body of activities in which all will participate—experiences needed to develop the ability to understand the problems of living in a democratic social order. These include the cultivation of the civic responsibility of the individual, the maintenance of human relationship to other human beings and to the resources, forces, and elements of natural environment.

It is imperative that young people in school learn about the social, economic, and human-geographic problems which press so urgently for solution; that they learn to come to grips with the earth-conditioned problems which affect the life of the individual and the social group at large. Along with the development of the mental capacity of the individual, we must be concerned with his development of a conscious-

ness of environment and of the operation of those ecological laws to which our social and technological society is subject.

This point of view is entirely consistent with what is known about the nature of the learning process. The learning of an adult in society is only an extension of the way a child learns in school—that is, by being confronted with a real situation and stimulated to find a solution which is satisfying to him. If the learning situation in school is artificial, academic, and remote, and if the child is led to it by drives which he does not share, and if he is not called upon to evaluate what he does in terms of social results, he is more likely than not to form the general habit pattern of allowing himself to become aware of undesirable situations without carrying them over into social action or injecting them into his appraisal of the social scene about him.

Obviously we must be less concerned than now with setting out subject matter to be learned and more preoccupied with the development of the individual and the growth of his concern for his community's social and geographic well-being, his development into functional membership within the society of which the school purports to be a selected juvenile sample.

A school becomes real and education realistic and functional only where pupils are brought into contact with the kind of materials and situations, and subjected to the kinds of challenges, and are led to develop the kind of ideas that are desirable within society in general. Pupils must be given a larger share of responsibility for participation in planning and carrying out attacks upon the problems which face society. Education in the best sense of the word is a maximum development of the capacity of the individual to understand and deal with the critical problems of his civilization. Our very conception of what democracy is should be the basis for determining the school's program. Democracy's problems should become the preoccupations of the school. There are definite implications in this, because conservation of natural and human resources and the development of conservational planning within the framework of democracy, constitute the largest single problem facing our society today.

THE EDUCATIONAL PROGRAM

The theoretical considerations underlying this new curriculum demand far-reaching changes in current educational practice: first, in the status of the child in the school; second, in the organization of the teaching-learning process; and, third, in the content of the so-called

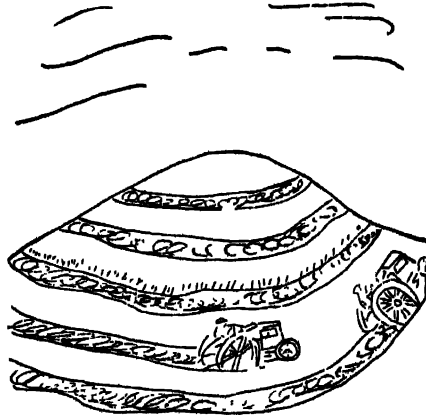
subject matter, that is, the experiences in which children are expected to participate. With regard to this third aspect, profound changes in the course of study are demanded. Our schools must begin to present the facts of and about conservation. So far, they have not done so. Nature study, conservation, planning, slum clearance and housing, and other matters bearing upon the welfare of society must be given a central position in the school program of experience.

The Primary School

The young child may be taught nature study, led to see and understand trees, birds, flowers, scenery, and the beauty and order in nature. He may be led to understand himself in a preliminary way, his rights in relation to the rights of others. He can be led to develop elementary conservation attitudes which will grow and expand in later years.

The Elementary School

Conservation in the elementary school is not a "subject" and should not be regarded in any such light. Rather it is a point of view or



Contour Plowing Holds Water for
Absorption - Slows the
run off and holds the soil
Alex Valdez

Grade 3, Three Rivers School, Tucson, Ariz.
Courtesy of Anne Raymond and
the Soil Conservation Service.

FIG. 56. School children can learn about conservation in the art class.

educational atmosphere which ought to pervade the whole program. It should enter into the entire range of "subjects"—art, reading, arith-

metic, elementary science, geography, history, civics, and spelling. It can well be made one of the unifying cores or themes in the curriculum. As a preliminary step to the realization of such a condition, the teachers of history, geography, and civics may each develop and put into operation a unit of work in conservation, or initiate some project or activity of a conservational nature. The pupil should become increasingly aware of his community and its environmental background and relations during his elementary school years. (See Fig. 56.)

The Secondary School

This program of rebuilding the school subjects around a conservation motif should continue into and through the high-school years. Resources, resource uses, community surveys, and planned use of resources yield a broad array of topics and problems which can enlist the efforts and participation of all high-school teachers and classes. General science offers the opportunity to study soil, soil erosion, the water cycle, drainage, water power, and elementary resource engineering, indeed, most of the basic resources and natural processes.

The biology class offers a fertile opportunity for studying forest, grassland, and wildlife, insect pests, diseases, public health and sanitary measures, and the ecological balance in nature. Chemistry can contribute studies of soil fertility and plant nutrition, water pollution, mineral resources and so forth.

History offers a splendid chance to examine past civilizations and their use and ruin of their resource base, of our own record of development through the exploitation of resources, and its accompanying record of waste and devastation.

Geography offers perhaps the greatest opportunity for teaching the facts about resources and for guiding the thinking of youth on conservation problems. This, however, is not as promising as it may sound, because for several reasons deeply embedded in our American educational policies very little geography is being taught in the public high schools. In many ways, this is one of the most peculiar situations in American education. Geography today is one of the most dynamic subjects in the curriculum of the elementary school and, where taught by trained teachers, one of the most valuable. Paralleling this, geography in the college and university has during the last fifteen years expanded more rapidly than any other subject. But, between these, there is a great hiatus at the high-school level. There, indeed, geography has actually been losing ground. This is perhaps owing to the blindness of secondary-school administrators to several

facts, one of which is that democracy cannot hold its own in the United States unless supported by a much broader type of citizenship than exists at present and that geography must be one of the chief instruments in training for such citizenship.

As a corollary to this, it may be stated that our total well-being (that is, our standard of living, our esthetic values, and the quality of our human stock) cannot be maintained without conservation, and this in turn cannot be accomplished unless conservation is made an integral part of our educational process.

In pursuance of this, courses in the conservation of resources are being introduced into institutions of higher learning. This will help to train the next generation of teachers, but it still does not touch directly the great mass of citizens in the making; this latter is the task of the secondary school. In this connection it is hopeful to observe that recently a few high-school courses of study in geography have made mention of conservation. Also, very recently, there has appeared a new geography textbook for senior high school, written primarily from the standpoint of conservation and national planning. These are perhaps symptomatic of larger changes yet to come wherein conservation will have become one of the chief motivations for social-science work in the secondary school.

Until such changes occur, however, an immediate advance may be made by the high-school teacher of geography by planning one unit of study on conservation of resources and incorporating it in the geography program. Its value would be great enough that its substitution for other materials customarily taught should be justifiable in nearly every instance.

The civics class has a special task confronting it. To teach the facts about suffrage, the Constitution, laws, and to salute the flag and sing patriotic songs are not sufficient. As W. S. Salisbury cogently points out, civics should instill a knowledge of one's duties and responsibilities as well as privileges, particularly in connection with the *general good*. It should educate for the idea that everyone should sometime during his or her lifetime make a contribution of service to the national welfare. It should develop a positive program for citizenship service which "would mobilize the youth resources of the nation to conserve and develop the natural economy and the social health of the nation."²

² W. S. Salisbury, "Duties to Match Our Privileges," *Journal of the National Education Association*, Vol. 30, No. 1, p. 3.

The Community Plan

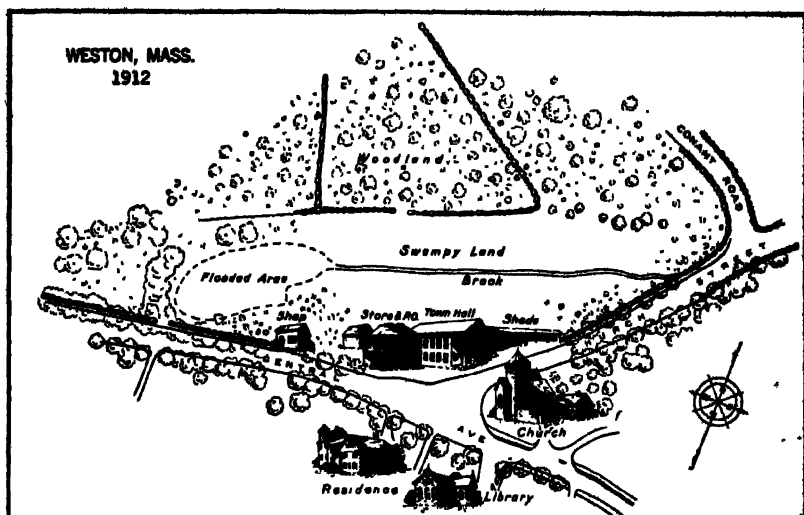
All the areas of learning on the secondary level should be collectively responsible for seeing that no child leaves school without having participated in a conservation survey, learning therefrom what are the natural and human resources, where misuse exists, and where waste is going on.

Every community is physically a special case. The local natural environment is in a certain sense unique. The local rural community, village, or city should, therefore, have a distinct "personality." The whole problem of planning is to adapt that personality to the natural environment. Planning as a process is based upon finding the answers to five problems:

1. What should children have?
2. What should adults have?
3. What should future generations have?
4. What selfish or interested groups now profit by the poor conditions which now exist?
5. What remedial measures and controls are necessary for the general welfare?

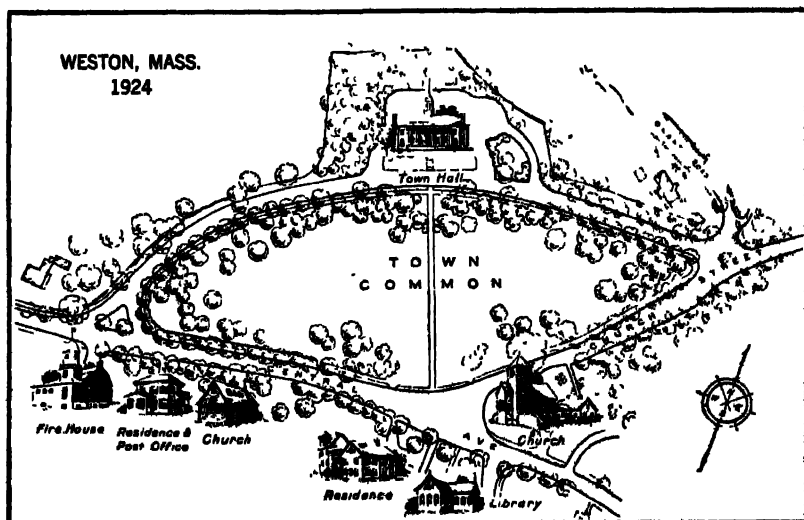
Each high-school child should have the opportunity to prepare and draft a plan for his community. (See Figs. 57*a* and 57*b*.) The steps in the making of such a plan should be:

1. Redesign a civic center.
2. Redesign the street pattern to fit the topography and give best access to the civic center.
3. Design public uses for bodies of water, scenic spots, and physical features.
4. Replan and co-ordinate transportation facilities.
5. Design a permanent green belt to confine the community.
6. Design a system of parks and playgrounds.
7. Draw up a plan for the prevention of closer settlement and building except in specified places.
8. Make a plan whereby, as houses become obsolescent, yards will be combined into larger plots with orchards, gardens, and ample recreation space—this in the interests of posterity as the only way of undoing the havoc we have wrought in this phase of community design.
9. Draw up plans for eliminating water and air pollution.
10. Devise a program for wildlife restoration and care as far as compatible with community interests.



Courtesy of the U. S. Department of Agriculture.

FIG. 57a. The center of the village of Weston, Massachusetts, in 1912, before planning.



Courtesy of the U. S. Department of Agriculture

FIG. 57b. In 1924, after planning.

11. Formulate a policy for continuous planning and replanning, for encouragement of local institutions and industries, for providing continuous directed change.
12. Let the community see these plans in the hope of arousing interest and a desire to act.

FINAL VALUES

Natural and man-made resources are nothing in themselves. They are significant only as they minister to human welfare. Our future national security demands better care of resources and closer integration of the nation with its resource base. Conservation holds out the assurance of an increased standard of living and decreased human wastage. It also promises a more beautiful and orderly country. The psychological effects upon an individual who lives and participates in a civilization where beauty, order, freedom from waste, and a concern for human welfare are dominant may be difficult to appraise, but they are impossible to overestimate. It is time to plant the educational seeds of such a civilization and to begin to plan for a mass movement of our people toward a better and more permanent America.

THE TEACHER'S FORUM

1. Can we expect democracy to survive in the United States unless school children are given an opportunity to deal actively with the major problems confronting democracy? Should the school child be allowed to participate in planning an attack upon these problems? What are the arguments for and against letting him do so?

2. Many educators today declare that education should center around the personal needs and problems of children. Is conservation a personal need or a "felt problem" of children, or is it a general social problem which is seldom if ever sensed by the child? If the latter be the case, what are the arguments for a "child-centered" curriculum in contrast to a society-centered one?

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